

Rock & Gem

SEPTEMBER 2015

THE EARTH'S TREASURES • MINERALS AND JEWELRY

VOL. 45 ISSUE 09

Wulfenite ***A Collector*** ***Favorite***



◀ **Field Trip Facilitator Teri Smith**

Stillwater Complex Chromite

Diamond Pacific's Demo Days

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Rock & Gem

Volume 45, Number 09

September 2015

ON THE COVER

Arizona has produced some of the most wonderful wulfenite specimens in the world. This 6.3-cm-high group of sharp crystals is from the Rowley mine (Maricopa County). (Jeff Scovil photo/Scott & Margie Adams collection)

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Printed in U.S.A.

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Rock & Gem (ISSN 0048-8453, USPS 486-290) is published monthly by Beckett Media LLC, 4635 McEwen Rd., Dallas, TX 75244. Periodicals postage paid at Dallas, TX 75260 and at other mailing offices. Printed in U.S.A. Copyright 2015 by Beckett Media, LLC
POSTMASTER: Send address changes to *Rock & Gem*, c/o Beckett Media, 4635 McEwen Rd., Dallas, TX 75244.
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Single-copy price \$4.99. Subscription in U.S.A. and possessions: 1 year (12 issues) for \$27.95; 2 years for \$49.95; 3 years for \$66.95. Add \$15.00 per year postage for Canada and all other foreign countries.
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READER LETTERS

Missing Article

I'm a fairly recent subscriber to *Rock & Gem*, and was pretty happy with it ... until May. The May issue promised a field trip article on South Dakota pegmatite minerals. Imagine my disappointment when the article was no where to be found. What happened to the article?

—Caitlyn Brewer
via e-mail

The field trip article "Black Hills Pegmatites", which was mistakenly referred to on the May cover, appears in the July 2015 issue.

—Editor



Chemistry Confusion

I read and greatly enjoy your magazine every month. Unfortunately, many of your articles are riddled with chemistry mistakes.

I love articles by Bob Jones—he is an amazing writer—but when he tackles chemistry in his articles, it is clear he doesn't have enough background in chemistry to attempt to do so.

Mr. Jones' article about Sulfosalts (Part II, March issue) is very good, and most of the chemistry is correct, but the beginning paragraph states: "The term 'salt' re-

fers to metal salts, ionic compounds that result when a metal is immersed in an acid bath."

The classic definition of a salt that everyone learns in high school chemistry is "a compound formed along with water in a neutralization reaction between an acid and base", not dissolving a metal in acid.

On page 42, in the "Rock & Gem Kids" section, the heading of the article "Emerald", by Jim Brace-Thompson, has the chemical formula $\text{Be}^3\text{Al}^2(\text{SiO}_3)^6$. The correct formula is $\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$.

I also find it a shame that the article on "Pecos Diamonds" in the March issue fails to mention that, just south of Roswell, New Mexico, in Artesia, one can find perfect, doubly terminated crystals, rather than the rosettes that are found at the locale mentioned. I have had many a fun rockhounding trip there.

—Ken Smith, Ph.D.
via e-mail

You can let Bob off the hook; the sentence about salts did not appear in his original manuscript, but was added during editing.

The unfortunate mistake in *Rock & Gem Kids* was the result of the wrong style being applied to the text at layout.

—Editor

Specimen Specifics

Thanks to *Rock & Gem* magazine and author Steve Voynick, I now I know where one of my first rock specimens came from.

In 1957, one of our rockhound neighbors took his family on a two-week road trip through the Southwest. When they returned, he gave me a piece of petrified wood, a black rock with visible gold on it, and a chunk of yellow uranium ore. I was 8 years old and determined to make a bomb with it. Fortunately, I failed, and my grandmother was much relieved.

The yellow rock fit the description of the sandstone in the Silver Reef article. I must have passed by the mine a dozen times. Next time, I will stop for sure.

Thanks to *Rock & Gem* and Steve Voynick's excellent article.

—Terry Vasseur
via e-mail

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LAPIDARY OF THE MONTH

SEPTEMBER 2015

I started this project with opal rough from Lightning Ridge, Australia. I do have lapidary wheels, but often find myself returning to my NSK Z500. It's a brushless micro motor used in dentistry. This rotary tool runs without hand vibrations, making it butter-smooth when cutting.

I start with sintered diamond bits to grind away any dirt and matrix. I also grind off the sides to expose the color bar. After close examination, I determine the best direction for cutting and use my diamond bits to expose the color and then shape the cabochon. Once the preform is done I use flat poly pad disks on rubber mandrels, to which I apply diamond grit with extender fluid. At each step, I wash the cab and check for scratches. Then I move to a finer grit, up to a 50000 polish.

To protect the finished opal, I designed a pendant with higher edges. I sculpt in a regular polymer clay, as it doesn't dry out and it seems easier to work with. Once my design is complete, I bake it and then create a silicon mold for the Precious Metal Clay (PMC.) With a quick mist of silicon spray, the PMC slips out of the mold with very little touchup required. Once it's dry, I sand it before firing and sometimes use this time to carve a bit more with a very gentle touch. This was fired for two hours in an Ultralite Kiln.

I discovered the hard way that it's better to solder on a bezel



after firing. At first, I tried to press a bezel into the PMC prior to firing, but the clay shrank away from the bezel, creating a cutout. I also soldered on the jump rings and chain and made sure the all the soldering was secure before setting the opal.

The texturing was also done prior to setting the opal as an additional means of protecting the expensive gemstone. I used a diamond bit to create a frosted texture on the interior recessed areas. Then the edges were brought to a high polish with a Gold Polishing kit for my rotary tool. The combination of the frosted and polished edge creates a classic look that is very pleasing to the eye. I believe

they are rubber. When texturing, I'm careful not to touch the bezel, as I don't want to work harden it prior to setting the stone.

Once the silverwork is complete, I set my stone in the bezel using a short wooden dowel rod. Using wood also reduces the risk of stone damage. Working gradually at opposing sides of the bezel, I work my way around, rocking the bezel over the top of the stone until it is set. The higher sides of the design make it a bit more difficult to burnish the bezel, so care must be taken at this step, but with a quick burnish and final polish, the piece is complete.

—Kerry Jo Montoya
Yukon, OK



Would you like to be named Lapidary of the Month?

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- Write a 500-word step-by-step description of how you crafted your lapidary project from start to finish. Save it as a document file.
- Take at least one sharp, close-up, color digital photo of the finished project. Photos must be high-resolution (300 dpi at 4 inches by 5 inches, minimum).
- Attach your document file and digital photo (.tif or .jpg) to an e-mail and send it to editor@rockngem.com with the subject line "Lapidary of the Month".
- Make sure you include your name and street address (not a PO Box)



for prize delivery should your entry be selected for publication. Only winners will be notified. E-mail the editor or call (972) 448-4626 with any questions about these requirements.

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11-13—ORLANDO, FLORIDA: Annual show; Central Florida Mineral and Gem Society, FL National Guard Armory; 2809 Fern Creek Ave.; Fri. 1 pm-6 pm, Sat. 10 am-6 pm, Sun. 10 am-5 pm; Adults \$5, Students \$2; Annual Fall gem, mineral, and bead show will be at the Florida National Guard Armory, 2809 South Fern Creek Ave. Orlando, FL 32806. Show will be on Friday September 11, 1pm to 6pm, Saturday September 12, 10am to 6pm, and Sunday September 13, 10am to 5pm. Go to www.cfmgs.org for \$1 off coupon. There will be demonstrations, 30 minute auctions, kids table, sluice mining for gems, and hourly door prizes. See and buy gems, minerals, beads, metaphysical stones, fossils and much more from all over the world. Scouts can earn merit badges from a mineral gemologist to assist with identification and requirements. Demos include cutting cabochons, faceting gems, wire wrapping, flint knapping and metal work. Adults \$5.00, Students \$2.00, Scouts free. Free Parking.; contact Paul Hayes, 1400 Sawyerwood Ave, Orlando, FL 32809, (407) 816-1229; e-mail: phayes3@cfl.rr.com; Web site: www.cfmgs.org

11-13—TOLEDO, OHIO: Annual show; Toledo Gem and Rockhound Club, Stranahan Great Hall; 4645 Heatherdowns Blvd.; Fri. 2 pm-8 pm, Sat. 10 am-6 pm, Sun. 11 am-5 pm; Adults \$4, Seniors \$3.50, Students \$3.50, Children under 12 free!; Active Military with ID and Scouts in Uniforms are Free, Exhibits, Lapidary and Jewelry making demonstrations, scholarship raffle, free kids' mineral kits, dealers, club sales; contact Stephen

continued on page 17

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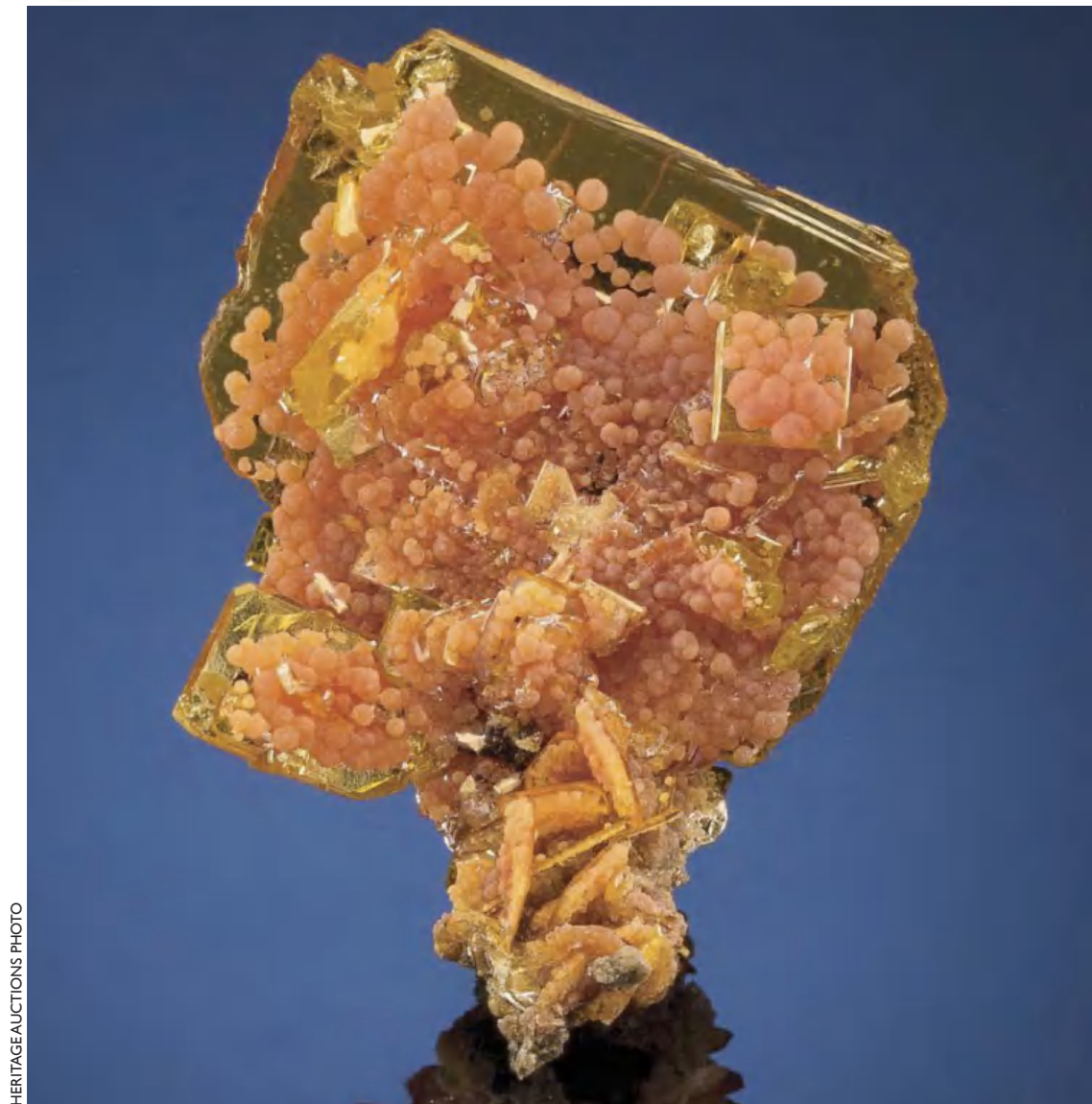
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My Favorite Minerals



HERITAGE AUCTIONS PHOTO

In the 1980s, the San Francisco mine produced large, square crystals of wulfenite with bright-orange mimetite balls. (Sonora, Mexico)

PART III: Wulfenite, Cerussite, Smithsonite, Legrandite and Selenite

Story by Bob Jones

I certainly have many more favorite minerals than the baker's dozen included in this three-part series. With limited space, I decided to describe the dozen species for which I have a special attraction. The seven I've described so far are agate, bournonite, azurite, malachite, cuprite, epidote and rhodochrosite. This part tackles five more: wulfenite, cerussite, smithsonite, legrandite and selenite.



Tsumeb, Namibia, is famous for its beautiful snowflake-twinned cerussite specimens.



This sheaflike group of legrandite crystals on rusty-brown limonite matrix shows tiny green areas of indeterminate composition. (Mina Ojuela, Durango, Mexico)

LEGRANDITE

Legrandite ranks as one of the more attractive minerals because of its bright-yellow color and long, acicular and prismatic crystals. Most of these crystals are from the Ojuela mine at Mapimi (Durango), Mexico, where they developed in cavities of light- to dark-brown iron matrix. The contrast adds to the beauty of these specimens.

The original find of legrandite was in the Flora de Pena mine at



Cobalt gives these curved smithsonite rhombs from the Tsumeb mine their deep pink color. The habit and color are classic for Tsumeb.

Lampazos (Nuevo Leon), Mexico. The crystals are a dull yellow, very small, and usually not freestanding, a remarkable contrast to those from Mapimi.

I recall when the first Mapimi legrandite began appearing in the 1970s. The water table in the mine had dropped enough that deposits of legrandite could be reached. The first pieces were rather dull-looking, but they soon gave way to bright-yellow crystals. Most crystals are an inch or so, in small sprays, often glassy,

BOB JONES PHOTO



▲ Jose Kovrig, editor Bob Jones, and curator Bill Panczner (left to right) are ready to dig wulfenite at the San Francisco mine, in Sonora, Mexico.

► Selenite is a favorite mainly because of my visits to two Mexican selenite caves. (Naica mine, Chihuahua, Mexico)

HERITAGE AUCTIONS PHOTO



and sharply prismatic. Very large quantities were mined at the time. I can recall in 1972 when Benny Fenn, an excellent mineral dealer, brought his first legrandite to a show. He was not sure of its value, as good legrandite was virtually unknown. He suggested it might be worth \$50, but I helped him sell it for \$500! Benny, in return, sold me a small “ball” of radiating legrandite crystals about 1½ inches across. It is, as far as I know, the only spherical specimen of legrandite crystals around.

Legrandite soon became one of the more valued minerals from Mina Ojuela. It was popular, and the demand always exceeded the supply. Then one night, I got a call from a mineral dealer named Jack Amsbury. Jack was very active in buying minerals in Mexico, in part because his delightful wife, Hortensia, had been a schoolteacher and was bilingual. Jack was pretty excited when he called and told me to get down to Tucson to see what he had just bought. Turns out he had an amazing legrandite consisting of two large, fanlike sprays of 4-inch crystals set together in opposite directions—a most remarkable specimen far larger than anything anyone had seen.

It was obvious the specimen was worthy of an article in *Rock & Gem* (see “The Killer Specimen”, March 1978). It was in this article that I named the specimen “Aztec Sun”, and the name is still being used to describe this amazing specimen. From Amsbury, the Aztec Sun went into

the Miguel Romero collection in Mexico. Miguel was a delightful friend who intended his collection to go to the University of Arizona upon his passing. It did not, and today the Aztec Sun resides in a museum in the Near East!

CERUSSITE

In contrast to colorful legrandite, the lead carbonate cerussite is normally colorless, occurring in white to water-clear, colorless crystals. There are exceptions, of course, thanks to impurities that sometimes get into its chemical structure.

While usually lacking color, cerussite is an outstanding collector specimen because of its varied crystal habits. It forms in the orthorhombic system, resulting in single blades, but is far more likely to take on various twinning forms. In other instances, it is found in slender, columnar crystals ranging from toothpick size to something as thick as a large felt-tip pen.

It can also develop in tabular crystals, and these are almost always twinned to form thick, V-shaped crystals. Tsumeb, Namibia, is noted for this type of twin. This famous mine is also noted for reticular-twinned cerussite. These are groups of crystals that are all connected at a 60° angle to form open-lattice geometric patterns. The finest examples of this type of twinning resemble a snowflake with flattened front to back, but with a near-circular, reticulated 6- to 7-inch open disk. These are undoubtedly the most valued of the cerussite crystal forms.

The mineral can also develop as nice, nearly rounded sixling twins, in which six crystals have twinned side by side to form a disklike cluster. The form of cerussite that I have been able to collect in quantity is called jackstraw cerussite. This is the more available collector type, since it forms in huge quantities and is not in such high demand.

Jackstraw cerussite looks like so many matchsticks growing in subparallel, vertical clusters. They are snow-white unless stained tan by iron oxide or colored grey by included black sulfide. My favorite collecting site is no longer open, but when it was we could crawl down into the open cut in the rotten gossan and dig into the badly decomposed rock to open pockets filled with jackstraw crystals. The pockets could be several feet across, and collecting was simple, since the matrix was pretty loose. The number of flats of crystals you collected was determined by the amount of time you had to extract specimens. The supply seemed endless.

Very large cerussite V twins have come from several sources. The Stevenson Bennett mine, in the Organ Mountains of New Mexico, produced wonderful V twins 7 inches long. Tsumeb was also a source of such large V twins. This mine was rich in cerussite as it produced literally thousands of twinned crystals when it was operating.

As prolific as Tsumeb was for producing superb cerussite, a nearby mine at

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Otavi, the Kombat mine, produced what I consider the most beautiful twinned cerussite crystals I've ever seen. Tsumeb's snowflakes are superb, but the simple V-twinned cerussites from Kombat are in a class by themselves. The largest are only 2 inches or so long, but each twin is thick, slightly rounded, and somewhat gemmy. What would normally be the open space between these twinned crystals is filled almost completely; only a small re-entrant angle is visible at the top. The slightly rounded look and shape of the Kombat material makes them look like a heart! Needless to say, owners of these beauties seldom part with them.

SMITHSONITE

I doubt any collector would mistake a smithsonite specimen for a heart, though many of them look like colorful kidneys. Smithsonite, a common zinc carbonate, is well worth collecting because of its variety of colors and superb crystal forms. When the mineral is mentioned among collectors, most of them immediately imagine the rounded botryoidal masses that have come from the Kelly mine at Magdalena, New Mexico.

Granted, the specimens from this old mine are classics and much sought, but smithsonite comes in a wonderful assortment of colorful, modified trigonal crystals. Many of the crystals have the typical dogtooth shape, except that they tend to have curving faces, so they look rounded. The finest crystallized smithsonite crystals come from Tsumeb, where they can be colored white, yellow, blue, or a lovely pink. The pink color can be quite intense, bordering on red.

Botryoidal smithsonite can also boast many colors. The mineral is actually colorless to white, but smithsonite develops in a mineral-rich solution environment that is fraught with impurities, which can act as chromophores. The result is smithsonite that is blue or green from copper ions, yellow from cadmium ions, or pink from cobalt ions.

A small mine at Choix (pronounced "chocks"), in Sinaloa, Mexico, has yielded large masses of this mineral. They come in a variety of colors, most often pink. It is not unusual to see a specimen with one color, like pink, shading into another, like violet.

The more difficult form of smithsonite to obtain is the stalactitic form originally from the Iglesias district of Sardinia. Fine, banded, yellow stalactite growths were once collected there and sliced. It also occurred as yellow, botryoidal masses, but the Sardinian material is only available from old collections or museums. In fact, at the Munich Show in October 2014, I saw three small slices of Sardinian yellow smithsonite for sale. They were snatched up before the show even opened!



HERITAGE AUCTIONS PHOTO

Wulfenite from the Red Cloud mine in Arizona is one of the standards of the mineral-collecting world.

Yellow smithsonite has been found in America at Yellville (Marion County), Arkansas. This old lead mine once produced superb, yellow botryoidal and stalactitic smithsonite. In a few cases, it also formed bright-yellow pseudomorphs after dolomite.

Aside from Choix, there are several noted localities for smithsonite in Mexico. They include Mapimi, Santa Eulalia, and Naica. The finest smithsonite from these sources is the bright-blue botryoidal masses from the San Antonio mine at Santa Eulalia. This still-functioning mine has also produced some remarkable orange-colored massive material.

Several places in Arizona are noted for smithsonite—Bisbee for one. But some of the nicest botryoidal green smithsonite comes from the 79 mine, near Hayden. The nice thing about this mine is that it is being worked for specimens, so smithsonite is just one of the species still available from here.

Also in Arizona is an interesting old mine that produced very pretty dark-brown, sparkling, botryoidal smithsonite crystals. Rockhounds have collected large masses of this material. The microcrystal faces on these specimens refract light, so various bright colors flash back at the viewer. The smithsonite from this mine, the Old Dick, was originally called "monheimite".

When you consider the wide range of localities that have—and may still—produced smithsonite specimens, every collector should own several examples that demonstrate the range of colors and crystal forms this zinc carbonate is capable of having.

WULFENITE

I'll conclude this series with my most favorite mineral, wulfenite. There is little space in which to describe all the sources of this lead molybdate, which is both beautiful and delicate. There are more than 100 sources for the mineral just in Arizona and Mexico.

Wulfenite is not always delicate. The old, classic Meis mine, in Yugoslavia, produced blocky, sturdy, zoned orange-yellow crystals to an inch or so on an edge. Much more recently, the great wulfenite locality at Los Lamentos (Chihuahua), Mexico, yielded huge quantities of blocky, zoned, orange wulfenite on white calcite, some of the more beautiful and sturdy ones ever found. The Erupción mine is not played out, but the water table has prevented efforts to explore for more of these beauties. Time will tell if more will ever come from the mine, Los Lamentos again.

Wulfenite of fine quality has recently been mined at Touissit and Mibladen, Morocco, fine yellow to yellow-orange blades with barite. Superb small, rich-orange crystals found at Bleiberg, Austria, have a somewhat different form: pyramidal, tapered crystals a half-inch or longer. Mapimi produced similar specimens. Fine, tabular crystals have come from Uzbekistan, Iran and Kazakhstan. Tsumeb is well known for its fine, large, yellow, tabular crystals, some of them approaching 2 inches on an edge.

Arizona, the Copper State, has also produced some of the most wonderful wulfenite specimens collectors can dig and enjoy. Ask most collectors which wulfenite is the best, and the answer you'll get most often is "Red Cloud", meaning specimens from

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11-13—WINSTON-SALEM, NORTH CAROLINA: Annual show; Forsyth Gem And Mineral Club, Education Building, Winston-Salem Fairgrounds; Enter Gate 9 from 27 th Street; Fri. 10:00 am- 7:00 pm, Sat. 10:00 am-7:00 pm, Sun. 12 noon-5:00 pm; Adults \$3.00, Students K-12 Free; Activities; Gold Panning, Geode Cutting, Grab Bags and Mineral Identification.; contact W. A. Marion, 1163 Bear Creek Church Road, Mocksville, NC 27028; e-mail: mariona1@yadtel.net; Web site: www.forsythgemclub.com

12-13—HANFORD, CALIFORNIA: Annual show; Digginsproductions , Hanford Civic Center; 400 N. Douty St; Sat. 10:00 am-6:00 pm, Sun. 10:00 am-6:00 pm; Adults \$2.00, Children are Free!; Rock, minerals, slabs, fossils. Demonstrations, Jewelry; contact Kathy Corbett, 341 cedar st., Hanford, CA 93230, (559) 904-4795; e-mail: Corbett1@sbcglobal.net; Web site: Digginsproductions.com

12-13—PORT ANGELES, WASHINGTON: Annual show; Clallam County Gem and Mineral Association, Vern Burton Community Center; 308 East 4th Street; Sat. 9 am-6 pm, Sun. 10 am-4 pm; Admission is Free!; contact Jennie Bourassa, PO Box 98, Sequim, WA 98382, (360) 681-0372

12-13—NORTH ADAMS, MASSACHUSETTS: Annual show; Northern Berkshire Mineral Club, Eagles Hall; 515 Curran Highway; Sat. 10 am-6 pm, Sun. 10 am-4 pm; Adults \$4, Seniors are Free, Students are Free, Children are Free; The show will feature choice minerals, gems, jewelry, gifts, geode cracking, gem panning, door prizes and refreshments.; contact Larry Michon, 385 West Main Street, North Adams, MA 01247, (413) 663-8430; e-mail: lmichon@rcn.com

12-13—WALLA WALLA, WASHINGTON: Annual show; Marcus Whitman Gem and Mineral Society, Walla Walla County Fairgrounds; 363 Orchard St; Sat. 10 am-5 pm, Sun. 10 am-5 pm; Adults \$2, Children are Free; contact Jack Edwards, (509) 529-3673; e-mail: jcedwards1475@yahoo.com

12-20—DENVER, COLORADO: Annual show; Eons Expos, LLLP, Denver Coliseum; 4600 Humboldt Street; Sat. 9 am-6 pm, Sun. 9 am-6 pm, Mon. 9 am-6 pm, Tue. 9 am-6 pm;

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18-20—SAN RAFAEL, CALIFORNIA: Wholesale and retail show; Gem Faire Inc, Marin Center; 10 Avenue of the Flags; Fri. Noon-6 pm, Sat. 10 am-6 pm, Sun. 10 am-5 pm; Admission is Free!; Fine jewelry, precious & semi-precious gemstones, millions of beads, crystals, gold & silver, minerals & much more at manufacturer's prices. Exhibitors from around the world. Jewelry repair & cleaning while you shop. Free hourly door prizes. ; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: http://www.gemfaire.com

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18-20—HOLLAND, MICHIGAN: Show and sale; Tulip City Gem & Mineral Club, Civic Center; 150 West 8th Street , (between Pine & Maple Streets); Fri. 9 am-8 pm, Sat. 9 am-7 pm, Sun. 11 am-5 pm; Adults \$3 each; Free parking. **MASTODON - MICHIGAN'S STATE FOSSIL** offers Special Exhibits from 2 museums & 3 colleges plus Personal Collection displays. DEALERS in minerals, crystals, fossils, geodes, jewelry & meteorites. INTERACTIVE OPPORTUNITIES include Kids Games, Silent Auction, Club Sales, Gem Sluice, Fluorescent Tent, Touch Rocks and Lapidary Demonstrations. ~ Our 46th Annual Show will be Educational and FUN!!; contact Rebecca Cistaro, PO Box 2082, Holland, MI 49422-2082, 616-393-9307; e-mail: cistaror@mail.gvsu.edu; Web site: www.tulipcity.org

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FAVORITE MINERALS from page 16

HERITAGE AUCTIONS PHOTO



The Erupción mine is not played out, but the high water table is currently preventing further efforts to collect wulfenite specimens. (Sierra de Los Lamentos, Chihuahua, Mexico)

the Red Cloud mine in western Arizona, near the Colorado River. The world's finest red wulfenites were mined here in 1880 and 1937. The Red Cloud was re-opened for specimens several years ago and a huge cache of crystal groups was mined that resembled those classic crystals in color.

Though I live in Arizona and have collected underground at the Red Cloud, Rowley, 79, and other Arizona mines, I must say the finest wulfenite in the world comes not from Arizona, but Mexico.

The San Francisco mine, in Sonora, produced amazing yellow-orange blades of wulfenite, some of them approaching 5 inches! Clusters of these richly colored crystals were encrusted with, and sometimes enclosed, bright-red spherules of mimetite. The combination of orange-yellow, glass-clear wulfenite with richly colored red balls of mimetite makes the most stunningly beautiful specimens of wulfenite from anywhere in the world.

The Arizona Sonora Desert Museum wanted to replicate a pocket of San Francisco mine wulfenite so Bill Panczner, Curator, made arrangements to be notified if a crystal pocket was found. The plan was for Jeff Kurtzman, photographer, my son Evan, Bill and myself to go to the mine and get images of the wulfenite pocket in place, dig it out and install it at the Museum.

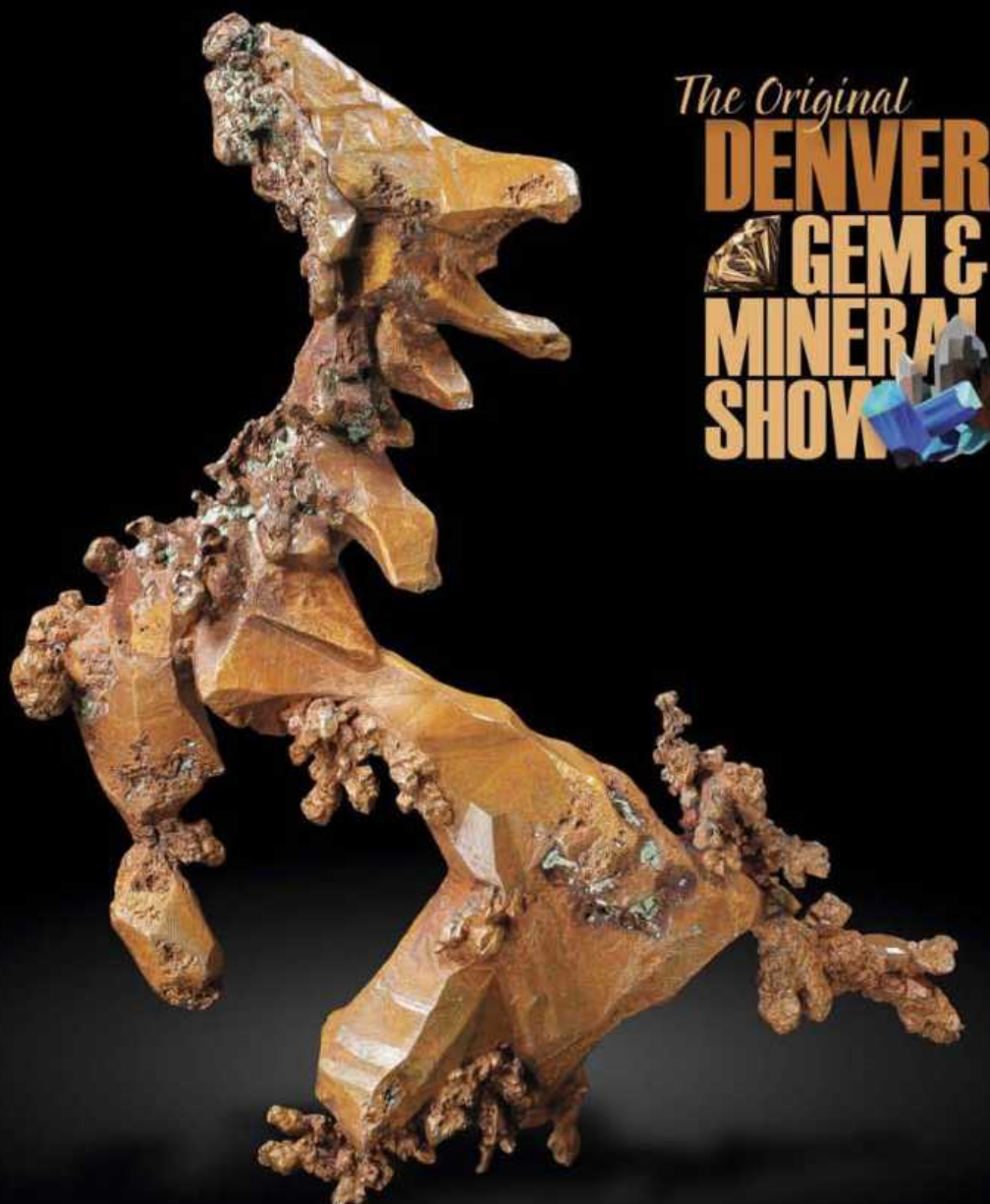
We got the call and made a dash into Sonora. We went underground and the pocket proved to be an open seam about 2 feet wide at the base and extending vertically several feet lined with crystals but they proved to be brownish yellow and lightly coated with a brown material, not suitable for display. Evan was allowed to collect one specimen while kneeling in the pocket surrounded by crystals.

SELENITE

Selenite is a favorite mainly because of my visits to two Mexican caves, the Buena Tierra mine and Naica, both of which I've described in detail before. The Buena Tierra cave has since been destroyed during mining, but the Giant Crystal Cave at Naica is known around the world, thanks to a video done by National Geographic.

This cave boasts crystals reaching some 40 feet in length and up to three feet in diameter. They are the largest known free standing crystals of any mineral. The cave has been sealed and only authorized scientists can enter. Luckily, I was able to get into the cave a couple of times before it was closed off. To see these giants of selenite was a lifetime thrill. The fact that the cave temperature was approaching 140°F. shorted our visits but I would not have missed the experience for the world. As long as the company keeps mining at Naica the cave is safe but once the pumping of water stops the water table will rise inexorably and the cave will eventually be flooded. Since selenite is slightly soluble who knows what will eventually happen to these giants.

Fortunately for collectors, selenite is a very common mineral and though you can never own giant crystals there have been nice 3-foot crystals found elsewhere and one pops up now and then. Superb crystallized mineral groups are readily available and every collector ought to own and admire this colorless but finely crystallized hydrous calcium sulfate species. A showy spray of these lovelies is a nice addition to any mineral collection and could become one of your favorites. Selenite has joining my other favorites and is a most welcome species anytime I collect! 💎



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BENCH TIPS

by BOB RUSH

Do You Compete?



Do a mockup of the case at home and take a photo to help you duplicate the setup at the show.



The AFMS's Uniform Rules for competitive cases are the standard upon which the judges base their decisions.

Every craftsman likes to show off the results of his labors. In June, my wife and I had the pleasure of entering our display case into competition at the California Federation of Mineralogical Societies (CFMS) show in Lodi, California. It had been a few years since we'd competed. This year, we entered the Open Division—A7 Mixed Display, Masters Group, which includes items from multiple divisions, such as carvings, lapidary, metalwork and jewelry.

Competing in a local or regional show is a challenging, educational, fun and rewarding experience. It does require considerable reading and studying of the current edition of the American Federation of Mineralogical Societies (AFMS) Uniform Rules. The Uniform Rules can be downloaded at amfed.org/rules.

When you enter your case in the Lapidary Division, there are many Classes that you can choose from, including carvings, cabochons, faceted gemstones, bookends, spheres, intarsia, mosaics and knapping. Each class has its own specific requirements and rules. Because my hobby specialty is cabochons, I sometimes enter a case in the Cabochon Class.

The first step is reviewing the rules for Division C-Lapidary. The definition of a cabochon requires that it be made of a lapidary material that is not tumbled, be suitable for wearing as jewelry, and be cut by hand. It can be a traditional shape like

oval, round, square, teardrop, heart, etc., with a domed top, or it can be a freeform shape with a flat top.

The Cabochon Class requires that at least 25, and not more than 60, cabochons be displayed and that they are cut from a variety of materials of varying hardnesses.

I use 1-inch-thick foam insulating board from the local hardware store, wrapped with material, as liners for the bottom and sides of the case. I choose material that complements the display and does not have a pattern or texture that would distract the eye of the viewer. Take careful measurements of the inside of the case so that the liners fit very well.

You can use standard acrylic stands to hold the cabochons upright. The labels must be neat and easily readable, and conform to the other requirements in the Uniform Rules.

Most of the time, you are limited to using 150-watt bulbs for your lighting. I wouldn't recommend using LED's or fluorescent bulbs because the light is too diffused. I use the screw-base halogen lights because they have a more directed beam of light. It is very helpful to do a mockup of the case at home and take a photo so that you can be sure to set it up correctly at the show.

When you are setting up your display, pay close attention to details such as having the cabs and labels lined up exactly.

Wipe the cabs down with a soft cloth so that there won't be any fingerprints or lint on them. Aim all of the cabs so they point to a central focus spot in the front of the case.

The cases are generally judged on labeling, showmanship, quality and workmanship, with the workmanship category being awarded the most points in this Division and Class. The focus is on awarding the most points per category as possible, rather than removing points, during the judging process.

The awards are granted according to the final points earned for that specific Exhibitor Group, such as Master, Advanced, Novice, Junior, and Junior Society. Multiple blue ribbons can be earned in each Exhibitor Group if more than one case earns the minimum number of points for that level.

I urge you, if it's at all possible, to study the rules, hone your showmanship, and present your best work for these competitions. It is a terrific learning experience and the best means of showing off what really inspires you in our hobby. 💎

Bob Rush has worked in lapidary since 1958 and metal work and jewelry since 1972. He teaches at clubs and at Camp Paradise. Contact him at rocksbob@sbcglobal.net.



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Mountain View Chromite

Collecting at a Historic “High” Camp

Story and Photos by Mark Leatherman

While I was a student at Indiana University (IU), I was a president of the student chapter of the Society of Economic Geologists (SEG) there. The chapter formed in March 2012, and we immediately went to work on planning our first large field trip for the next year. Although many SEG chapters take international trips to active mines, we decided that, as an infant group, it would be best to start somewhere familiar and domestic.

Since the IU Geological Field Station is located in Montana, it was an obvious choice of destination for our first large trip. In planning which mining areas and other geological hot spots to visit, the very first place that came to mind was the country’s sole current producer of platinum: the Stillwater mine.



The rhythmic, inch-scale layering of anorthosite and pyroxene absolutely cannot be missed en route to the old mining grounds.

The Stillwater Complex, classified as a 2.7 billion-year-old layered mafic intrusion (LMI), is located in the northern Beartooth Mountains, in south-central Montana, which originated as part of the Laramide Orogeny that started 70 million to 80 million years ago. In comparison to other LMIs, such as the Skaergaard Intrusion in Greenland, Stillwater's layering is considered quite complicated. As such, Stillwater has been intensively studied for over a century, with many questions still needing to be addressed.

There are a host of scientific journal articles—way too numerous to list here—that give an excellent description of Stillwater Complex geology. A great article for the interested reader to start with is

titled “The Stillwater Complex: A Review of the Geology”, by I.S. McCallum, and is easily found on Google. The article goes into great depth of the myriad lithological units present in the Complex, without detracting toward a specific scientific question.

In general, the Stillwater Complex is divided up into five lithological series (from bottom to top): basal, ultramafic, lower banded, middle banded, and upper banded. The basal series is known for hosting disseminated (or “peppered”) sulfide minerals. The ultramafic series is divided into two zones composed chiefly of peridotite (olivine) and bronzitite (partially-altered, iron-rich pyroxene with a distinctive bronze sheen along cleavage planes).

The banded series are divided up into multiple zones consisting of norite, gabbronorite, anorthosite and olivine-bearing rocks. Multiple thin layers of chromite are notably found in the ultramafic series. Another distinctive thin unit called the J-M Reef, located in the Lower Banded Series, hosts chalcopyrite, pyrrhotite, pentlandite and chromite mineralization. Micro-scale sulfide minerals and alloys within the former three minerals serve as the source of platinum and palladium.

Classical thought suggests the rhythmic lithological layering came about through the injection of multiple pulses of magma into the same magma chamber, bringing about more-or-less repeating rock types. Debate continues to the present day as to



The quantity and habit in which chromite occurs can tell a lot about complex magmatic processes. The trace, interstitial chromite seen amongst dominant olivine (close-up) is indicative of early, typical cooling of ultramafic magma.

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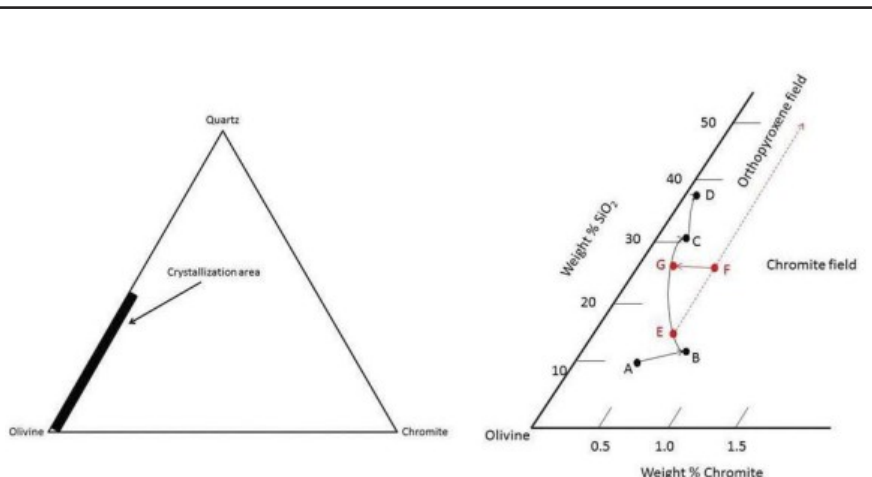
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CHROMITE from page 23



This model ternary diagram displays the mineralization sequence of an ultramafic magma. With normal cooling, starting at point "A", olivine is the first mineral to crystallize. Crystallization would proceed along the path to point "B", where a minute amount of chromite can start to briefly crystallize with olivine (path toward point "C"). At "C", orthopyroxene becomes the dominant mineral to crystallize. In taking the same scenario but, say, at point "E", additional silica-rich material (i.e., wall rock) is assimilated into the magma. (This can actually happen anywhere along path B-C.) This scenario would push the crystallization path toward point "F", where a greater quantity of chromite can crystallize and form significant veins, as observed at Mountain View. Chromite crystallization would continue until the magma composition reached point "G", and then proceed onto points C and D, as before (modified after Irvine, 1977).

the exact mechanisms, processes and roles in which precious metal and sulfur saturation in magma, and subsequent deposition, occurred.

Given the IU economic geology research group's prior research at Stillwater, arranging a group visit to the mine went without a hitch. The only caveat was that, due to our group's size, an underground tour featuring the J-M Reef would not be logistically possible. Still, we would be treated to a very interesting and fun tour.

After traveling west from Custer, South Dakota, through the Black Hills, we stayed in Columbus, Montana, the night before the tour. It was a one-hour drive to the mine site outside the town of Nye. After talks on safety and Stillwater geology, we spent some time looking at drill cores to get our eyes trained to the rocks to be seen on the tour. We then piled into two vans and followed two mine geologists up-mountain, driving on top of the current underground mines, via the Mountain View mine access road.

The ride on up treated us to some fabulous views of the Beartooth Mountains, low-lying clouds, and mining operations. We made sure our drivers did not get too distracted, as the path was rocky and narrow, without guardrails, and it was a long way down! After a few twists and turns upward, the convoy finally got to a more-or-less flat and nonperilous point next to a pine-topped outcrop.

We studied the contact between the ultramafic series and the lower banded se-

ries. The side of the outcrop right next to us was chock-full of pyroxenite, and we had no trouble finding hand specimens containing the shimmering luster of bronzite. Most of the cleavage crystals were on the centimeter scale, although inch-scale crystals could also be had with some lucky and careful hammering.

Only a few paces up the trail, the shift in mineralogy was quite sharp; the rocks became a noticeably lighter color due to the appearance of plagioclase, found in norites of the lower banded series. After collecting bronzite specimens, we loaded back into our vehicles and drove a few hundred meters to our last outcrop before reaching the top.

This outcrop nearly resembled a zebra! In actuality, this was inch-scale, rhythmic layering of white anorthosite and dark pyroxene. This stop did not offer much in the way of collecting, but it sparked valuable discussions about how this remarkable layering came about.

Chromite (FeCr_2O_4) is actually a solid-solution mineral in which aluminum can substitute for chromium to form hercynite (FeAl_2O_4), or magnesium and zinc can take iron's place to form the aptly named mineral members magnesiochromite (MgCr_2O_4) and zincchromite (ZnCr_2O_4). Atomic substitutions of manganese, titanium and silicon are also possible. Out of the solid solution members, only chromite and magnesiochromite are known to be effective ores of the metal responsible for stainless steel,



On the lower bench with the boulder, a number of us were finding heavy chunks of peridotite with interstitial, millimeter-scale, sparkling chromite grains.

refractory material, and other corrosion resistant alloys.

Fortunately, the chromite found at Mountain View does fit into the ore-grade category for refining. Reserves of chrome, along with copper and nickel, were known at Mountain View and other surrounding prospects since the 1880s. However, it was not until World War I that interest in the strategic metals intensified for the war effort.

At the end of the war, chromite demand plummeted, only to be revitalized during World War II, when the Anaconda Copper Co. was the biggest producer in the area. After World War II, the area continued to be sporadically worked until all mining activities ceased in the early 1960s. The closure of chromite interests was due to a failure in competing with sources in South Africa and Russia, as the mineral chemistry in those locales was easier to process due to a lower silica content.

It was only a few years later that the discovery of the J-M Reef ensured that mining activity would continue in the area to the present day. It is reported that up to 80% of the Western Hemisphere's chromium reserves are in the Stillwater area!

As we drove farther up the road, the twists and turns, as well as the peril level of the drive, decreased as we entered into a more heavily wooded area. The caravan parked in a wide-open area next to a couple small and rusted structures. Fog shrouded this level of the mountain, so after an impromptu change into slightly warmer clothing, the company geologists led us westward into a scene nearly resembling something out of Sleepy Hollow.

As we walked along, only seeing a few dozen yards in front of us, we started to find decent hand specimens of nearly-massive sparkling, black chromite embedded in the dirt trail and lying next to some old infrastructure. The mineralization is actually drusy octahedrons with a slight purple tinge, and requires a good hand lens for full appreciation. After a short

hike, during which all members found at least a couple nice specimens, we came to a vast field hosting a whole housing complex in which the old-time miners resided. Of course, we all gravitated towards the eerie structures, spending a few moments inside and getting a feel for how World War-era miners lived. None of us could quite imagine what it was like to live and work in the place, especially with comparatively primitive technology.

The next sight we came across was truly unbelievable: a tall, old wooden staircase that looked like it literally reached the heavens! It turns out the chrome miners hiked up the stairs each day, with a full load of equipment and food on their backs. Reflecting on the relatively harder times, we approached a ton-scale boulder near our next collecting area. We realized that present-day times have their own difficulties when one of the geologists remarked that the boulder had occupied its current position for only a week, with a rather muddy-looking hill looking like it helped it on its way!

With some watchful eyes focusing uphill, we dispersed to find peridotite (massive olivine) and more chromite specimens. This area had two benches, or levels, on which plentiful specimens were found: the upper, which has the wooden staircase, and the lower, with the boulder and a drop-off slope from which more old-time buildings were barely visible through the fog.

Most of the group gravitated toward the boulder for their next round of searches. In pretty much no time, a number of us were finding heavy chunks of peridotite with interstitial, millimeter-scale, sparkling chromite grains. The term "interstitial" refers to growth along or between crystal grain boundaries. In this case, interstitial minerals and textures have some interesting implications for magmatic processes.

One of the most challenging questions that have historically puzzled geologists is how to account for the quantities of

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CHROMITE from page 25



This ore specimen has scattered mineralization of mostly chalcopyrite with pyrrhotite and pentlandite, and is from the J-M Reef that has kept mining going in the Stillwater area.



Drusy, single-terminated octahedral crystals of chromite are best spotted with some help from sunlight.

chromite found at Stillwater, as well as the patterns the mineral exists in. With typical crystallization processes in a magma chamber (i.e. crystal-gravitational settling and chemical diffusion), only around 1% chromite can form in and settle out of a mafic magma (black path on ternary diagram), nowhere near enough to account for the extensive seams of the oxide mineral found at Mountain View and other nearby mines.

The 1% mineralization is the right quantity for interstitial-type mineralization between olivine grains. Thus, the large Stillwater magma chamber needs that something extra to produce sizeable and multiple chromitite veins. In 1977, a geologist by the name of T.N. Irvine came up with a petrologic model that could simply, but adequately, explain how significant chromitite seams can arise. If a hypothetical mafic magma chamber was contaminated (assimilated) with siliceous material (SiO_2), say from the chamber roof, it would drive the crystallization path (red path on ternary diagram) farther right toward the chromite end, in which the mineral would be the dominant phase (mineral) crystallizing out for a brief period of time.

Another viable mechanism is magma mixing with the right initial chemical compositions. Since the Mountain View chromite is known to have a high amount



The road up to the Mountain View mine requires careful driving, especially when it is foggy.

of silica, it is thought that wall rock assimilation into magma was the dominant mechanism in promoting this type of ore formation.

Outside the Mountain View mine, but still within the Stillwater Complex, are chromite occurrences in which mineralization takes the form of pods and lenses within altered ultramafic rocks. Two particular districts, the Red Lodge and Sheridan, report historic chrome reserves of this variety. The presence of massive and interstitial specimens of chromite, as well as vein and discrete pod deposits, testify to the wonderful complexity of magmatic processes that have shaped the Stillwater Complex dating back to Archean time.

To arrange a visit for your club, contact Ennis Geraghty at egeraghty@stillwatermining.com. Visiting a place with such great history—and located right above the nation's only current producer of platinum and palladium—definitely requires more than simply asking permission. If one—or more likely, a group—gets the privilege to visit, however, it will be time well spent in collecting a rather rare, but important, mineral. With politics playing a major factor in any type of mining activity, and with South Africa and Russia having seen better days, it is anybody's guess when the hallowed mining grounds at Mountain View will be prompted back to life! ♦

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Long time opal miner Tim Seekamp and father Collin test drilling, on a beautiful sunny Aussie morning, with a 9' investigator rig at their claim at Turkey Ridge Opalfield near Coober Pedy Australia during my May 2014 opal buying trip to Australia.

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ROCKHOUND RENDEZVOUS

Diamond Pacific Brings a New Dimension to a Club Picnic

LYNN VARON PHOTO



Story by Jim Brace-Thompson

Like most rock clubs, the Ventura Gem & Mineral Society (VGMS), in Southern California, hosts an annual summer picnic for members. In fact, the requirement to host such an event is written into our society by-laws and operating regulations. But for the past seven years, we've kicked this picnic to a whole new level thanks largely to the vision, efforts and connections of a single member, Ron Wise, in partnership with the Diamond Pacific Tool Corp.

LYNN VARON PHOTO



Don gives club members the opportunity to try out Diamond Pacific machines, including Pixies, Genies, Titans, Bigfoots, flat laps, swing-arm slab saws, trim saws, and band saws.

Ron has elevated a simple club picnic to a multifaceted event that includes members of our club and the nearby Oxnard Gem & Mineral Society and Conejo Gem

& Mineral Club. Activities now include much more than just fellowship and reminiscence over a good meal. A glance at the numbers reveals just how well our new



Don Depue of Diamond Pacific fielded questions and shared lapidary hints and tips with VGMS members.

concept has been received within the Ventura County rockhound community.

Our first event, in 2008, drew some 35 participants, but this year's attendance was double that. Plus, this year we enjoyed something very special. Shortly before lunch, our society president, Diane Cook, called everyone to attention, and Ron and his wife, Jean Wise, renewed their wedding vows on the occasion of their 50th anniversary, with a ring that was goldsmithed at Quartzsite. (It was actually their 51st anniversary, but as Ron said, "I'm always a day late and a dollar short, so let's call it 50 and do it!")

Just as he has enjoyed a long and steady marriage, Ron has been a long and steady steward and instructor for the VGMS workshop. Since his retirement from teaching in the local school district, he has devoted countless hours, alongside our other great shop stewards, to improving our workshop facilities, giving classes on knapping, rock slabbing, and cabbing, and to organizing and helping to run the silent auction at our annual club show.

Ron has also ramped up his own rock-hounding activities, and he and Jean are frequently out and about, exploring for finds in classic localities along the West Coast and across the deserts of the Southwest. Over the years, he has donated many a fine specimen to our club silent auctions: Richardson Ranch, Oregon, thunder eggs; Burro Creek agate from Arizona; red-and-yellow Lavic Siding jasper and beautifully speckled Morgan Hill poppy jasper from California; and other rocky delights.

During Ron's many collecting trips into California's Mojave Desert and during stints at Camp Zzyzzx (the annual week-long spring workshop of the California Federation of Mineralogical Societies), he has struck up a cordial relationship with the folks at Diamond Pacific Tool Corp. in Barstow, particularly with Don Depue. Diamond Pacific is a manufacturer of lapidary machinery, most famously the Genie and Pixie Gem Makers (grinder/polishers). The company helps supply tools and equipment for Camp Zzyzzx and offer equipment for sale to camp participants. It was through Don that Ron worked to bring a "Demo Day", or "Fun Day", to Ventura that ended up transforming our regular summer picnic.

"Fun Day" had its roots over a decade ago with a club in the Porterville/Exeter area of California that asked Don to bring demo machines to its picnic. As Don relates it, "all clubs have issues", and a club member wanted to plan a day devoid of any issues. It would be a day to bring all the members together in an informal event just to have fun, interact, and play with lapidary equipment. No formalities, no debating or bickering over this or that, and—what with Don supplying all the equipment and heading set-up and tear-down—no responsibilities. People would have a chance to try out equipment they might not normally see or use, they would acquire new lapidary skills, they would interact and learn from one another and—most of all—they would come together and just enjoy a great time.



JIM BRACE-THOMPSON PHOTO

In a special moment at this year's Rockhound Rendezvous, Ron and Jean Wise renewed vows after 51 years of marriage, with Lowell Foster as pastor. Ron is the guiding force behind the Rendezvous.

Mel Hixson, a member of the Ventura club at that time, had a summer cabin near Porterville. He had participated in one of those "Fun Days", which had become an annual event, and he had told Ron about this great experience. For the next two years, whenever he was passing through Barstow or on January visits to the rock shows at Quartzsite, Arizona, Ron pursued Don to ask if a similar arrangement might be made with the Ventura club.

Finally, Don agreed, and there has been no looking back. It has become a treasured VGMS institution that we've christened our "Rockhound Rendezvous", and we look forward each and every year to seeing Don and to trying out Diamond Pacific machines, including Pixies, Genies, Titans, Bigfoots, flat laps, swing arm slab saws, trim saws, band saws, ring saws, Foredoms, tumblers, and more.

If members know of a machine they'd like to try, they're encouraged to contact Ron, who will try to arrange to include it in the Rendezvous. In addition to the machines, Don brings an assortment of slabs that folks can purchase, along with basic lapidary supplies like Genie wheels and other accessories, cab templates, grit and polish, books on lapidary arts, and more.

As noted, Don has assisted in such events with other clubs. He prefers to keep it relatively local and a convenient drive from his home base in Barstow. To keep expenses low, he usually stays with a local club member rather than in a hotel. However, in exchange for gas money, he has ventured as far afield as Ogden, Utah,

JIM BRACE-THOMPSON PHOTO



▲ The lapidary equipment brings a new dimension to a primarily social event.

► In addition to providing equipment, Diamond Pacific sold slabs that members like Frank and Jeff could instantly transform into cabs with demo saws and Genies.

JIM BRACE-THOMPSON PHOTO



LYNN VARON PHOTO



JIM BRACE-THOMPSON PHOTO



The variety of equipment Don brings allows club members a chance to try out tools they might not normally see or use.

During the tailgate rock swap, some members apparently just wanted to get rid of the rocks cluttering their backyards!

for a two-day event. Still, that has proved to be the exception rather than the rule, so if you're looking to hold a Rockhound Rendezvous of your own in New York City, you just may have to seek out a willing partner a little closer to home.

While Ron is the real engine behind our Rockhound Rendezvous, given the way it has evolved and grown, this day would not be possible without a concerted effort from our whole group. Although it remains a "fun day", it does now come with responsibilities, and a good number of stalwart VGMS members kick in to help arrange parking, set up a food station, set up the Diamond Pacific machines, and lay out a silent auction, while docents give first-time visitors to our facilities a tour of the place and of our club museum.

VGMS is fortunate to enjoy a great venue for our clubhouse, which is situated in the countryside across from a county park, with ample space for setting up the demo station and for parking. Other clubs wishing to pursue a similar event may need to make special arrangements to secure an appropriate venue.

A big consideration is a ready source of electrical outlets to power the many machines Don provides. The first year we did this event, we also powered up our own club machines, resulting in flipped circuit breakers in our fuse box! Make sure you have plenty of outlets and that your power supply will prove adequate.

Our Rendezvous lasts from 9 a.m. to 3 p.m. For a lunch break, Don provides pulled pork, paid for with funds supplied

by VGMS. The club provides drinks and basic supplies (paper plates, napkins, cups, plastic utensils) and members bring an assortment of side dishes, salads and desserts for a huge potluck.

Before and after lunch, members and guests have plenty of opportunity to try out Diamond Pacific machines. We also offer attendees the opportunity to swap self-collected rock, mineral and fossil specimens and their own lapidary creations with fellow rockhounds in an informal "tailgate", and to participate in a silent auction that basically pays for the event.

The silent auction features rocks, minerals, fossils, lapidary slabs, faceted stones and other materials from the club rock pile and from member donations. This year, the auction raised nearly \$300, which



A club-sponsored silent auction more than paid for picnic supplies, with funds left over to support the club workshop.

more than paid for the lunch and supplies, with a nice little bit left over for our workshop maintenance.

Our VGMS Rockhound Rendezvous has evolved into a miniature version of such tailgate-oriented California shows as the Orcutt Mineral Society show in Nipomo and the Stoddard Wells Rockhound Tailgate, sponsored by the Victor Valley Gem & Mineral Club. Ron and other club members have entertained visions of expanding the Rendezvous into just such a larger event. Since that would require much more advance coordination, business licenses, an expanded venue to accommodate parking, and—not least—a concerted volunteer effort from club members who already host a pretty big and active annual show each March, we've put such visions aside and have kept the focus local and amateur.

We concentrate on learning basic lapidary arts, playing with Diamond Pacific machines, and engaging in rock exchanges with members from our own club and from nearby clubs rather than expanding into a full-scale tailgate with professional dealers and wider publicity to draw in a bigger crowd. In short, thanks to the generous spirits of both Ron and Don, and going back to those beginnings in Porterville, with our Rockhound Rendezvous, we just seek to have fun! 💎

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ROCK SCIENCE

by STEVE VOYNICK

Conchoidal Fracture

Mineral fracture is described in such terms as uneven, hackly, splintery, irregular and conchoidal, with the last term being most familiar to rockhounds. Visually distinctive and readily identifiable, conchoidal fractures are one of the diagnostic features of the most abundant and widely collected of all minerals: quartz. Conchoidal fracturing is also the mechanical basis of flaking, a skill and art form originated by Paleolithic stoneworkers and still practiced by flint knappers today.

The term "fracture" defines the irregular breakage tendency of a mineral and must not be confused with "cleavage", which refers to separation along regular, internal crystal planes.

Conchoidal fractures appear as smoothly curving, concave breakage surfaces that consist of smaller, undulating curves, similar to those on the inner surfaces of bivalve mollusk shells. The word "conchoidal" is actually derived from the Greek *konchoeidēs*, meaning "like a mussel".

Conchoidal fractures occur only in crystalline materials that have no cleavage planes and in certain very fine-grained, noncrystalline materials. Quartz, the quintessential example of a crystalline material that fractures conchoidally, consists of silica tetrahedra bonded together within a three-dimensional lattice. It crystallizes in the hexagonal system, which is apparent in its primary habit: a six-sided prism. Despite its well-defined, external form, quartz has no internal cleavage planes because its crystal lattice is bound entirely by strong, covalent atomic bonds that exert strength evenly in all directions.

Despite its hardness (Mohs 7.0), durability, and lack of cleavage, quartz is somewhat brittle and fractures when struck with a hard, sharp-edged or pointed object. Deformation or fracturing begins at the point of impact and is accompanied by a shock wave of mechanical energy that radiates through the quartz. The primary direction of the radiating energy is controlled by the direction of the impact.

When a flint knapper strikes a piece of quartz, both the fracture and the shock wave progress through the quartz at an angle slightly declined from the surface. Almost instantaneously, the fracturing of the quartz absorbs some of the energy in the shock wave. As this energy decreases, the shock wave exerts its greatest pressure and



Very fine-grained quartzite provides a textbook example of a conchoidal fracture.

"steers" the fracture toward the direction of least resistance, which is back toward the surface of the quartz.

An impact of the proper energy, direction, and duration results in a separated flake and a conchoidal depression in the surface of the quartz. Precise control of impact direction, energy and duration is the key to success in the flint knapper's art.

A type of conchoidal fracturing can occur in other minerals with poor cleavage such as pyrite and bornite, in which fracture tendencies are usually described as "subconchoidal".

Several homogenous, noncrystalline materials also fracture conchoidally. A man-made example is glass; among the natural, homogenous, noncrystalline materials are obsidian, a volcanic glass, and opal, a hydrated silica. Even anthracite coal can fracture conchoidally.

Very fine-grained (aphanitic) rocks can also exhibit conchoidal fractures. Rocks usually tend to fracture along the interfaces of their individual mineral components. But when their mineral grains are extremely small, rocks will fracture conchoidally, leaving a smooth depression with the distinctive, concave, "shell-like" shape of a conchoidal fracture. This fracture is also seen in such common fine-grained rocks as rhyolite and quartzite, both of which were flaked into tools by Paleolithic stone workers. ♦

Steve Voynick is a science writer, mineral collector, former hardrock miner, and the author of books like *Colorado Rockhounding* and *New Mexico Rockhounding*.



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A Tale of Two Craters

VIA WIKIMEDIA COMMONS



An aerial view of Meteor Crater gives a better idea of its immense size.

Meteors Left Their Mark on Arizona and Texas

Story by Helen Serras-Herman

HELEN SERRAS-HERMAN PHOTO



The Holsinger meteorite is the largest fragment of the 150-foot meteor discovered to date. Iron meteorites have been found in the area that range in size from 10 to 1,000 pounds.

Meteor craters are depressions in Earth's surface created by the impact of a meteor or comet. There are about 150 meteor craters around the world, making them rare land features. Some craters have eroded and some have been buried, while others are obvious, with a noticeable and measurable rim. Craters are usually measured by the size of their rim's diameter. There are more than 40 craters with rim diameters over 20 km around the world, in South Africa, Australia, Canada, Russia, Mexico, the United States, and other countries. There are 28 craters in the United States alone that range in size from less than 1 km wide to 90 km wide. They include Arizona's Meteor Crater and the Odessa Meteor Crater in Texas.



The Odessa Meteor Crater is almost full of vegetation, which makes it hard to see the borders of the crater, but it is still well worth the stop.



The guided rim tour lasts about 45 minutes to an hour and is headed by very knowledgeable staff members. You cannot walk to the crater floor or around the rim by yourself.

METEOR CRATER

Located in northern Arizona, approximately 37 miles east of Flagstaff, Meteor Crater is a famous site. It is easily accessible off Interstate 40, near Winslow, along the famous Route 66. In the scientific community, it is referred to as the Barringer Meteorite Crater, in honor of the geologist who proved that the hole was the product of a meteor impact. Earlier on, it was also known as Coon Mountain or Coon Butte.

At 4,000 feet (about $\frac{3}{4}$ mile) across and 500 feet deep, Meteor Crater is eight times larger than the Odessa Crater. It is the result of an asteroid collision that happened about 50,000 years ago, during the last ice age (the Pleistocene epoch), when a fiery ball from the sky landed and exploded there. Researchers have estimated that at its core was a nickel-iron meteorite, about 150 feet wide, weighing approximately 300,000 tons.

The meteor exploded, broke apart and some became pulverized and partially melted rock, spread along with sandstone and limestone in an area of a six-mile radius. Iron meteorites that have been found in that area range in size from 10 to 1,000 pounds. During that era the area was full of woodlands, woolly mammoths and giant ground sloths. As the ice age ended and the forests gave away to the deserts, less erosion and sediment accumulation took

place, leaving the crater as obvious as we see it at present time.

The crater's circumference is 2.4 miles, and visitors can walk along its rim. There is no vegetation within the depression, making it easier to see and understand it as an impact crater.

A very interesting aspect is that, although scientists have been observing meteorites for centuries, no scientist had made the connection between the existence of craters and meteorites until the 20th century. The crater was known as Canyon Diablo in the 19th century (due to the practice of naming geological features after the nearest community served by a post office), when it was discovered by European settlers. They assumed the crater was volcanic in origin.

In 1891, Grove Karl Gilbert, the chief geologist for the US Geological Survey, first hypothesized about the crater's formation. Unfortunately, he concluded that the crater was the result of a steam explosion and not of an impact, even though thousands of meteorite fragments were present all around.

Daniel Moreau Barringer (1860-1929) was born in North Carolina and graduated from Princeton and the University of Pennsylvania's Law School. He also studied geology and mineralogy at Harvard and University of Virginia. Like so many other Easterners, he was enamored of



Daniel Moreau Barringer (1860-1929) was the first geologist to prove the crater hole was the product of a meteor impact.



The Odessa Meteor Crater museum has a gift shop with a few books, souvenirs and Odessa meteorite specimens for sale, of which we had to add one to our collection.

the West. He purchased a gold and silver mine near Cochise, Arizona, in 1892 and later discovered the Commonwealth Silver mine in Pearce, Arizona.

By 1902, these mining ventures had made Barringer a wealthy man. In 1903, when he heard about the existence of the Meteor Crater from S. J. Holsinger while sitting on the veranda of the San Xavier Hotel in Tucson, he received a land patent, staked a mining claim, and created the Standard Iron Co. in hopes of mining iron from the site. When he found small balls of meteoric iron in the ejecta on the crater's rim, he wrote that he "no longer doubted ... [the crater] must be due to the impact of a body colliding with our earth" (www.barringercrater.com/about/history_3.php).

In 1906, Barringer and his mining partner, Philadelphia mathematician and physicist Benjamin Chew Tilghman, presented their first papers to the Academy of Natural Sciences in Philadelphia about their theory of a meteorite impact at the site. Acceptance of the theory was important to their fundraising efforts, as it would be costly to mine the tons of meteoric iron Barringer insisted must be present. This crater was the center of a heated debate that lasted many years, until all the scientific community accepted the impact theory.

It turned out that Barringer vastly overestimated the amount of iron in the crater. After spending a fortune on exploratory drilling, the effort was abandoned on Nov. 23, 1929. Barringer died a few days later, on November 30, of a massive heart attack. However, his theory of the crater's origin was vindicated, and the site is known to-

day, as determined by the Meteoritical Society, as the Barringer Meteorite Crater. The site is still owned by his descendants, who formed the Barringer Crater Co.

The large Visitor's Center includes an 80-seat wide-screen movie theater, where visitors can watch the movie "Impact: Mystery of Meteor Crater", which features exciting 3D modeling and animation for a very realistic viewing experience. The 10-minute film is shown twice per hour. The Meteor Crater Interactive Discovery Center offers a lot of information (much of it is interactive), displays, and 24 exhibits about meteors and their encounters with Earth, space, the solar system, and comets. One of the displays is the very impressive Holsinger meteorite, the largest fragment of the 150-foot meteor discovered to date.

Visitors can view the crater from an air-conditioned indoor area. There are also three outside lookout platforms, with several free (no coins required) telescopes so that you can see the bottom of the crater and the remnants of the old mining operations, left there for historical purposes. The recommendation is to reserve about an hour and a half to go through the Discovery Center and the lookouts.

Then, join the guided rim tour (included in your admission fee), headed by very knowledgeable staff. The tours last about 45 minutes to an hour. You cannot walk to the crater floor or around the rim by yourself. On the trail, visitors also pass the remnants of an old stone building that was the original crater museum.

There is still active scientific research and discovery taking place at this site. Also on site is an Astronaut Memorial Park,

with an actual Apollo test capsule and an American Astronaut Wall of Fame.

Meteor Crater is a private enterprise and, despite the site's geological importance, it not a national or state park. It was designated a National Natural Landmark in 1967. Entrance and tour information is at meteorcrater.com.

A fabulous, nine-minute narrated slideshow with a lot of educational and historical material is available on the Barringer Crater Co. Web site, www.barringercrater.com. Another online resource is the "Guidebook to the geology of Barringer Meteorite Crater, Arizona (a.k.a Meteor Crater)", by geologist and earth and planetary scientist Dr. David A. Kring (Lunar and Planetary Institute, 2007). A huge bibliography list is also included. Read or download it for free at www.lpi.usra.edu/publications/books/barringer_crater_guidebook/crater_guidebook.pdf.

Meteor Crater is situated in a remote area. On Interstate 40, travel 35 miles east from Flagstaff, or 18 miles west from Winslow, and take Exit 233 (Meteor Crater Road). Drive five miles to the crater site. It is an easy drive, as the road is paved all the way.

THE ODESSA METEOR CRATER

This past March, I was invited to participate in an art and craft show, the Celebration of Arts, held at the Midland Center of the Arts in Midland, Texas. It was a beautifully set up show, with a very well-organized preview gala party, that local patrons attended and supported.

It was a long trip for us, from southern Arizona to Midland, which is located in western Texas, just past the city of Odessa.



The origin of Arizona's Meteor Crater, also known as Barringer Meteor Crater, was hotly debated by 19th- and 20th-century geologists.



The Odessa Meteor Crater site is easily accessible via a paved road from Interstate 40.

We often take our time travelling for these business trips, and add, whenever possible, a side trip to one or more of the local attractions. When I searched online for things to do in the area, the first site that struck our interest was the Odessa Meteor Crater site, which is located in the southwestern part of Ector County, just five miles from Odessa.

The Odessa Meteor Crater is the second largest recognizable crater, after Meteor Crater, in the United States, and is sixth in the world. In 1892, a local rancher by the name of Julius Henderson found a meteorite and discovered the crater. But it wasn't until 1929 that Daniel Moreau Barringer Jr., whose father had described Meteor Crater, identified the depression as a meteor crater.

The Odessa Meteor Crater was formed 63,000 years ago, in the Pleistocene epoch, when a meteorite rained down over an area of over two square miles. The larger masses of the meteorites struck the earth with such force that they penetrated the bedrock; 4.3 million cubic feet of rock were moved around, creating a main crater with distinctive bedrock features, as well as four smaller ones. The main meteorite, which produced the largest crater, is believed to have weighed 1,000 tons.

Over time, wind and water deposited silt and debris in the craters, and many were buried until the early 1940s, when a Dr. Sellards and Mr. Glen Evans, from the University of Texas, conducted excavations, drilling and research there. Originally about 100 feet deep, the main crater



The Meteor Crater Visitor's Center features an Interactive Discovery Center and museum.



▲ The Odessa Meteor Crater museum is filled with meteorite specimens, photos and books.

► A display case of specimens in the Odessa Visitor's Center Museum points out the differences between iron and stony meteorites.

is now a shallow depression about 15 feet deep, with a diameter of about 550 feet.

As the visitor walks around the crater, the low, rock-buttressed rim is still visible. Despite the research and drilling, no huge underground mass of meteorite has ever been found. It is believed that it may still lie 170 feet below the surface. More than 1,500 smaller meteorites have been recovered in the area over the years, of which the largest is approximately 300 pounds.

Geologists concluded from the thousands of fragments collected around the crater that the meteorite was of nickel-iron content, also containing small amounts of cobalt, copper, carbon, phosphorous sulfur, and chromium. Analysis was conducted at the Smithsonian Institution by G.P. Merrill in 1922, as described in the excellent publication "The Odessa meteor craters and other geological implications", by Glen L. Evans and Charles E. Mear (Baylor University, 2000). In that same book, the meteorites are described as being coarse octahedrites (siderites), partly oxidized, and similar to composition to those collected at the Barringer Meteor Crater in Arizona.

Today, the Odessa Meteor Crater site is a National Natural Landmark, designated as such in 1965 by the National Park Service. In 1979, the Texas Pacific Land Trust donated a 46-acre parcel that encompassed the crater to Ector County. County officials have enhanced the site with fences and pathways, and are dedicated to the preserving and protecting of the site, which suffered much vandalism after the 1940s studies.

Entering the site through a main gate, the visitor reaches the relatively newly built Visitor's Center, which opened in 2002. The museum is filled with meteorite specimens, photos and books, and there is a very helpful and knowledgeable attendant, ready to answer any questions you may have.

A 70-pound Odessa iron meteorite is on display at the Visitor's Center Museum. Only 10% of all meteorites are composed of iron; the majority are classified as stony meteorites, which very much resemble ordinary Earth rocks. There is a great display case of specimens that points out the differences between the types.

From the museum, there is a nature-trail path that takes the visitor on a self-guided tour around the crater's rim. Several informative signs along the way explain the geologic occurrence and all the points of interest. It is also important to obey the

posted safety signs, which instruct visitors to stay on the trails, watch out for snakes, and not remove any rock from the area. Standing on top of the crater's rim one can see the oil pumps dotting the background scenery, a reminder of where you are: oil country.

The Odessa Meteor Crater may not be nearly as impressive as the Arizona Meteor Crater and may not be considered a huge attraction; its smaller size and the fact that it is almost full of vegetation makes it hard to see the borders of the craters. It is still a rare meteor site, however, and well worth a visit. Allow at least an hour for visiting the site and museum.

There is no admission fee for the site, the museum, or the self-guided tour. Donations are welcome, and the gift shop has a few books, souvenirs, and Odessa meteorite specimens for sale. For current hours and information, visit www.odessameteorcrater.com.

The Odessa Meteor Crater site is just five miles west of Odessa and easily accessible from Interstate 20. Take Exit 108 (Moss Avenue/Meteor Crater Road), which is clearly marked with a brown road sign, and continue south for two miles. The road is paved all the way to the site.

Visiting these and other meteor craters is a great opportunity to learn about the out-of-this-world origins of some of Earth's most interesting rocks! 💎



In 1965, the Odessa Meteor Crater site was given the designation of National Natural Landmark by the National Park Service.

Helen Serras-Herman is a gem sculptor and jewelry artist with 30 years of experience. She was inducted into the National Lapidary Hall of Fame in 2003. See her work at www.gemartcenter.com.

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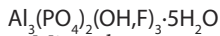
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Wavellite



Minerals are sometimes named for a person, and such is the case with wavellite, A hydrous aluminum phosphate. It was named in 1805 for the English physician who discovered it in Devon, England: William Wavell (1750-1829).

Wavellite is a mineral rich in aluminum and phosphorus that forms as soft (Mohs 3.5-4), needlelike, fibrous crystals that grow out in radiating, or “starburst”, clusters. These spherical clusters form little balls in shades that range from yellow-green to light lime green to dark green to brownish-green.

Clumps of them can form botryoidal crusts on matrix rock. They are translucent to opaque, with a vitreous to pearly luster. Broken crystals may exhibit concentric, multicolor zoning in cross section; some zones are light green and others are a much darker green.

Wavellite is found as crusts in metamorphic rocks as a secondary mineral. This means it formed when a mineral deposit became altered through such processes as weathering and low-temperature hydrothermal (hot water) alteration. Associated secondary minerals with high aluminum and phosphorous content include crandallite and variscite.

Arguably, the very best localities for specimen-quality wavellite are in the state of Arkansas, which is the source of many specimens sold at rock shows in the U.S. These localities include Mount Ida and Mauldin Mountain in Montgomery County and Avant and Hot Springs in Garland County. Other U.S. localities include Snyder and Cumberland Counties, Pennsylvania, and El Dorado County, California. Outside the U.S., notable localities include Bolivia, Germany, and France. Other than limited application in phosphate fertilizers, wavellite has few uses beyond an attractive mineral specimen. But for those who like green, attractive it surely is!

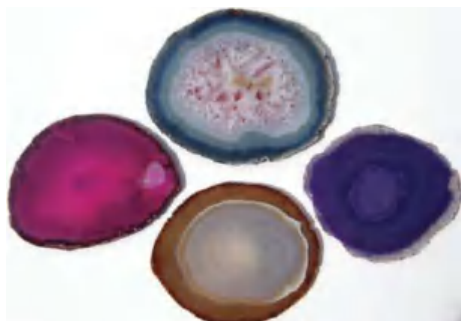
—Jim Brace-Thompson



Whole and broken wavellite crystal clusters



Natural (left) and dyed magnesite



Natural (bottom) and dyed Brazilian agate

Fakes, Phonies & Synthetics:

Dyed Minerals

Some rocks and minerals may look colorfully inviting, but buyer beware: They may actually be dyed! For hundreds of years, starting when Christopher Columbus sailed the ocean blue in 1492, the Idar-Oberstein district of Germany produced colorfully banded agates, but eventually the local agate supply played out. In the 1800s, Germans who had migrated to Brazil discovered agates there, and manufacturers back in Idar-Oberstein began importing them to cut and polish.

While some Brazilian agates are colorfully banded, many show drab shades of gray, yellow or brown. In order to make them more attractive, lapidaries began coloring them with aniline dyes to produce vivid, even garish, colors: bright purple, pink, blue, green and red. If you spot candy-colored agates at a gem show that look artificial, they probably are!

Turquoise is an iconic gemstone of the American Southwest. Bright, waxy, robin’s-egg blue turquoise is especially prized by collectors and jewelry makers. Most deposits of this quality are played out, but low-grade turquoise is available that is greenish or pale, with a chalky texture.

People discovered that this porous material can easily be dyed a more pleasing shade of blue, then sealed with resins or wax. The result is an attractive, but unnatural, stone that unethical dealers sell at the same price as authentic, quality turquoise.

A far less savory practice involves taking inexpensive white rocks with dark veining similar to that in turquoise and dyeing them blue. Minerals like howlite and magnesite have achieved dubious fame for the ease with which they may be transformed into “turquoise”, sometimes merely by soaking for a period of time in Tidy Bowl toilet cleaner. (This is an experiment you can try at home with adult supervision.)

—Jim Brace-Thompson

There's an App for Gems and Minerals

Today's tech-savvy rockhounds can identify minerals right from their iPhone or smartphone. These and other mineral identification apps are available from iTunes. Read the descriptions and user comments carefully and compare apps before purchasing.

Rocks & Gems (EasyStreet Apps) \$0.99

This quick-reference guide provides basic information and pictures for identifying the most commonly collected rocks, minerals and gems. Users can add their own photos. Customer Rating: 3.5 stars

Mineral Identifier (Brendan Winter) \$2.99

Select the photo that best represents the color, streak, transparency, luster, cleavage, fracture, tenacity and hardness of an unknown mineral and get a list of possible identifications. No customer rating.

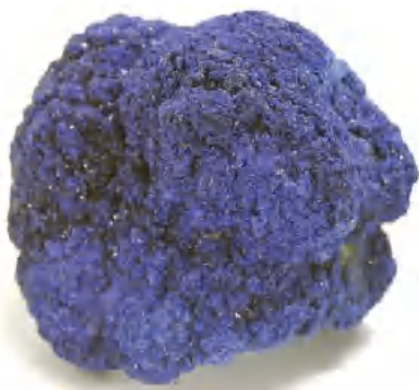
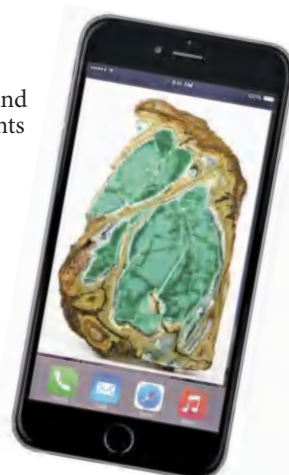
easyLearn Rocks & Minerals (Anu Vasuki) \$2.99

This simple app uses activities like sorting, matching, puzzles and trivia to teach elementary- and middle school-level information about minerals and rock formation. No customer rating.

Minerals and Gemstones (Jourist Verlags GmbH) \$3.99

More than 300 gems and minerals, organized according to internationally recognized classification groups, are illustrated with a clear and informative color photograph, accompanied by accessible text and its chemical composition. No customer rating.

All app purchases should be approved by the person who is responsible for paying the bill.



Mineral Name Word Scramble

Put the letters in the correct order to spell the names of minerals.

- | | |
|------------------|-----------------------|
| 1. PREPOC _____ | 6. GAMSENEIT _____ |
| 2. LINKEC _____ | 7. LEVAWTILE _____ |
| 3. TIEUZAR _____ | 8. LAMTIECHA _____ |
| 4. MUPSYG _____ | 9. RIVATIESC _____ |
| 5. LAGNEA _____ | 10. LADNARCTILE _____ |

ANSWERS: 1. COPPER; 2. NICKEL; 3. AZURITE; 4. GYPSUM; 5. GALENA; 6. MAGNESITE; 7. WAVELLITE; 8. MALACHITE; 9. VARISCITE; 10. GRANDALLITE

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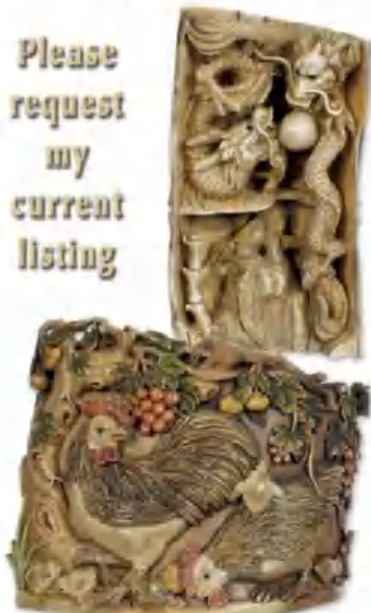
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JACKSONVILLE, FL

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Societies Annual Show;
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Bluff Road South, Jacksonville,
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Fri. 1pm - 6pm, Sat. 10am - 6pm,
Sun. 10am - 5pm

October 3 & 4
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Museum, 2040 N. Santa Fe Ave.,
Vista, CA 92083

Sat. 10am - 5pm, Sun. 10am - 4pm

October 11
FALLBROOK, CA

Fallbrook Gem & Mineral
Societies 2012 Fall Festival; 123
West Alvarado St., Fallbrook,
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Sunday 9am - 4pm

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19-20—HOWELL, MICHIGAN: Annual show; Livingston Gem and Mineral Society, Hartland Support Service Center; 9525 Highland Rd.; Sat. 10 am-6 pm, Sun. 10 am-4 pm; Adults \$2.00, Seniors \$2.00, Students 12-18 .50¢, Children 0-11 are free!; gem and mineral dealers, lapidary exhibits, fossils, unique jewelry, club table, children's table, silent auction, door prizes, grand prize, demonstrations: silver smithing, bead making, wire wrapping, faceting, free flint knapping lessons; contact Ed Oiler, 9525 Highland Rd, Howell, MI 48843, (810) 241-8801; e-mail: camber459@gmail.com; Web site: <http://www.livingstongemandmineralsociety.com/home.html>

19-20—CASTLE ROCK, WASHINGTON: 50th Annual Rock and Gem Show; Southern Washington Mineralogical Society, Castle Rock Fairgrounds; 120 Fair Lane; Sat. 10 am-5 pm, Sun. 10 am-4 pm; Admission is Free!; free parking; contact Diann Thurston, (503) 728 4274; e-mail: spuds@clatskanie.com

25-27—SANDY, UTAH: Wholesale and retail show; Gem Faire Inc, South Towne Expo Center; 9575 S State St; Fri. 10 am-6 pm, Sat. 10 am-6 pm, Sun. 10 am-5 pm; Students, Adults + Seniors \$7, Children ages 0-11 are free!; Fine jewelry, precious & semi-precious gemstones, millions of beads, crystals, gold & silver, minerals & much more at manufacturer's prices. Exhibitors from around the world. Jewelry repair & cleaning while you shop. Free hourly door prizes. ; contact Yooy Nelson, (503) 252-8300; e-mail: info@gem-faire.com; Web site: <http://www.gemfaire.com>

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25-27—OCEAN CITY, MARYLAND: Retail show; Treasures of the Earth, Inc., Roland E Powell Convention Center; 4001 Coastal Highway; Fri. 12 noon-6 pm, Sat. 10 am-5 pm, Sun. 10 am-4 pm; Adults \$5.00, Military Free with ID, Children 16 and under Free; Vendors from across the US bring their merchandise to you. You will find • 14K and sterling silver, classic, estate, fashion and handmade jewelry • Loose stones, beads and findings, pearls • Mineral specimens, crystals, lapidary supplies • Books, carvings and gift items ; contact Jane Westbrook, PO Box 59, Gloucester Point, VA 23062, (804) 285-4281; e-mail: jane@treasuresoftheearth.com; Web site: www.treasuresoftheearth.com

25-27—TOOELE, UTAH: Annual show; Tooele Gem & Mineral Society, Dow James Building; 400 North 400 West; Fri. 10:00 am-7:00 pm, Sat. 10:00 am-7:00 pm, Sun. 10:00 am-5:00 pm; Admission is Free; TOOELE GEM & MINERAL ROCK & GEM SHOW 2015, "FESTIVAL OF THE OLD WEST"; September 25, 26, 27, 2015 (Fri., Sat., Sun.), Hours: Friday & Saturday 10 AM - 7 PM, Sunday 10 AM - 5 PM, at the Dow James Building, 400 North 400 West, Tooele, Utah, Exit 99 off the I-80 Freeway onto SR-36, go South to Tooele, then turn Right on 400 North and go West to 400 West, Dow James Memorial Park is on your Right. FREE - NO ADMISSION FEE. ROCKS & GEMS, DOOR PRIZES, DEMONSTRATIONS, SILENT AUCTION, FOSSILS, DISPLAYS, JEWELRY, VENDORS. HELD IN CONJUNCTION WITH THE MOUNTAIN MAN RENDEZVOUS! FOR MORE INFORMATION CONTACT: Ed Gage 210-365-9149, or Colleen Edwards at 435-882-5752 or email us at TooeleGemAndMineral@gmail.com or Visit us on Facebook and Like our page! <https://www.facebook.com/TooeleGem?ref=hl> ; contact Ed Gage, Tooele Gem & Mineral, PO Box 348, Tooele, UT 84074, (210) 365-9149 or (801)599-6529; e-mail: tooelegemandmineral@gmail.com; Web site: www.tooelegem.com

25-27—JOPLIN, MISSOURI: Annual show; Tri-State Gem & Mineral Society, Joplin Historical & Mineral Museums Inc.; 504 Schifferdecker Ave.; Fri. 9:00 am-5:00 pm, Sat. 9:00 am-5:00 pm, Sun. 9:00 am-3:00 pm; Admission is Free!; 17th Annual ROCK-A-THON, gem and mineral expo. Held inside the Joplin Mineral Museum. Free Admission. Door Prizes. For more information EMAIL jmc-cwiseman@sbcglobal.net; contact Christopher Wiseman, (417) 623-1180; e-mail: jmc-cwiseman@sbcglobal.net

26-27—SANTA ROSA, CALIFORNIA: Annual show; Santa Rosa Mineral & Gem Society, Wells Fargo Center; 50 Mark West Springs Road; Sat. 10:00 am-6:00 pm; Adults \$6, Children under 12 Free; Lots of Vendors, Bake Sale, Raffle, Rough Rock Sale, Wire Classes, Fun Kid Stuff; contact Jolene Coon, (707) 849-9551; e-mail: jolene4srmgs@gmail.com; Web site: SRMGS.ORG

26-27—FRANKLIN, NEW JERSEY: Annual show; Franklin Mineral Museum, Franklin Elementary School; 50 Washington Ave; Sat. 9 am-5 pm, Sun. 10 am-4 pm; Adults \$7, Children \$4; Saturday, September 26th and Sunday, September 27th Indoor show: Saturday 9:00 am to 5:00 pm. Sunday 10:00 am to 4:00 pm. Outdoor Swap: Saturday 7:30 am to 6:00 pm. Sunday 10:00 am to 5:00 pm. Adults:\$7 and Children are \$4 (ages 6-16); contact Robyn Seger, 32 Evans Street, Franklin, NJ 07416, (973) 827-3481; e-mail: pesolutions.minerals@gmail.com; Web site: <http://spmom3.wix.com/franklin-gem-mineral>

26-27—DOWNEY, CALIFORNIA: Annual show; Delvers Gem & Mineral Society, Elks Lodge; 11233 Woodruff Ave.; Sat. 9 am-5 pm, Sun. 9 am-4 pm; Admission is Free!; 20+ vendors, displays, raffle, demonstrations, and wonderful grab bags.; contact Dale Harwood, 1914 El Segundo Apt. 2, Gardena, CA 90249-1871, (310) 217-0551; e-mail: nancyjbird@verizon.net; Web site: <https://groups.yahoo.com/neo/groups/delvers/info>

26-27—FRANKLIN, NEW JERSEY: Annual show; Franklin Mineral Museum, Franklin School; 50 Washington Ave; Sat. 9 am-5 pm, Sun. 10 am-4 pm; Adults \$7, Children Ages (6-16) \$4 ; contact Pat Seger; e-mail: pesolutions.minerals@gmail.com; Web site: <https://www.facebook.com/pages/Annual-Franklin-Mineral-Museum-Gem-Mineral-Show>

26-27—MONTEREY, CALIFORNIA: Annual show; Carmel Valley Gem & Mineral Society, Monterey Fairgrounds; 2004 Fairgrounds Road; Sat. 10 am-6 pm, Sun. 10 am-5 pm; Adults \$4.00, Children under 12 are FREE!; We have approx 15 dealers at the show featuring jewelry, cut and uncut gemstones, beads, crystals, rough and polished rocks, mineral specimens, and fossils. This annual event also has over 50 displays featuring the gem, mineral, and fossil collections of guest and member exhibitors. In addition, there will also be demonstrations of jewelry making, sphere making, rock grinding and polishing. A silent auction will run continuous-

continued on page 56

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The Pure Potential mine (North Geronimo mine), in La Paz County, Arizona, is a classic vanadinite locale. This rather large crystal is intensely colored and dramatically hopped.

COLLECTING

Vanadium

MINERALS

Vanadinite and Endlichite Boast Beautiful Crystals

Story by Bob Jones

Arizona is world famous for its wulfenite specimens, some of which are considered the best in the world. But for local collectors, there is another species that is beautiful and for decades an abundantly available, easily collected mineral: vanadinite. Mention the sources of Arizona wulfenite—the Red Cloud, Old Yuma, and Renaldo Pacheco mines, to name a few—and you are also listing good sources of vanadinite.

Vanadinite is not the only species rich in the metal vanadium, though it is the most common one. It is also one of the more colorful. The finest vanadinite is a bright cherry color. Some crystals are very interesting, as they start out bright-red at the base and gradually change to orange-red to orange, so that the termination, which can be severely hopped, approaches yellow.

ROB LAVINSKY PHOTO/ROCKS.COM



A 2009 find of vanadinite in the Mibladen Mining District was noted for its thick, robust crystals. (ACF mine, Midelt, Morocco)

ROB LAVINSKY PHOTO/ROCKS.COM



Endlichite, the rare arsenian-rich varietal of vanadinite, was once known as a species in its own right. (Los Lamentos, Chihuahua, Mexico)

In some cases, the vanadinite is a very showy caramel to brown color, as the arsenic impurity content increases. The most remarkable color in some vanadinite is a mahogany brown with a very strong luster. This type of vanadinite is high in arsenic. For a long time, it was called endlicheite, but the powers that be decided to get more accurate, and that name is no longer listed in modern mineral books. Arsenian vanadinite is its new name. The crystals are dramatically different from the standard hexagonal, hopped, red crystals. They are sharply tapered and take on a needle-like crystal form with a very sharp-pointed termination.

The finest vanadinite has come from several localities in Morocco. What is certainly the oddest vanadinite came from the Djebel Maheur mine, in Oujda, Morocco. These were somewhat rounded, as much as an inch thick, and up to 4½ inches long. They tapered slightly, so their terminations were rounded points. And they are ugly, thanks to a thick coating of dark-brown descloisite that hides their orange-red color, which you can only see on broken crystals.

Collectors today are far more familiar with Morocco's bright-red hexagonal crystals, found in tight clusters, stacks, and individual crystals. They are perfect hexagons, many of them hopped. Specimens can be up to 10 inches across. The crystals have brilliant color and luster and, when found on contrasting black descloisite or hollandite, are certainly among the finest vanadinite specimens ever found. The sources are varied and include Touissit (near Oujda), Toauz, and Mibladen (near Midelt). Local miners have explored these old lead mines to depth and have brought thousands of specimens to light.

Of course, such crystal sources generate stories of interest. In one case, the miners could no longer dig vanadinite because the water table had risen, blocking access to the veins. Not to be deterred, the miners dove into the water and swam to the dry ground at the collecting site, did their thing, and brought specimens out the same way.

Another interesting story of Morocco vanadinite involved my friend and an excellent mineral dealer Victor Yount, of Virginia. Victor's reputation as a collector/dealer was well established when he dug superb large, sharp, white dolomite crystals at Eugui, Spain.

When Vic found out about Morocco vanadinite, he headed over there. After a great adventure across the desert, he got to Mibladen and was able to obtain a quantity of superb vanadinite. The Moroccan government, however, had restrictions on shipping specimens, so Vic bought a couple of rugs and some brass pots and stashed the crystal specimens inside them. There was some problem with the police, but the specimens were shipped back to Spain and brought to America to be sold. Vic later



Endlicheite from the Moroccan localities was found in sharp hexagonal crystals up to a half-inch, in tight intergrown clusters.



The large, 1-inch vanadinite crystal in this cluster shows a stepped growth pattern that is typically seen in some Mexican vanadinite. (Jones collection)

made a fascinating film of his Moroccan adventures, which was shown in Tucson. From these two anecdotes, it is pretty obvious that collectors will go to almost any length to obtain fine specimens.

The type locality for vanadinite is Zimapan (Hidalgo), Mexico, where the mineral was found as small, red-yellow crystals. It is interesting that, when the Mexican material was researched and identified by mineralogy professor Andreas Manuel

del Rio, it did not completely reveal its secrets. Andreas thought he had found a form of chromium, so he named it "pan chromium". It was not until a couple of decades later that Nils Sefström, of Sweden re-discovered the element and named it vanadium; hence, our subject mineral is called vanadinite.

At that time, vanadinite was very expensive and rare, but once someone found that it gave steel marvelously tough properties,



The Apex mine is relatively unknown to collectors, but it produced some of the finest vanadinite in the Southwest in the early and mid-1900s. (Chihuahua, Mexico)

arge deposits were sought and its value dropped. The first person to use vanadium steel in quantity was Henry Ford. He used it to build his Model T car. I have never collected in Zimapan, but I have collected fine specimens in other Mexican localities, of which my favorite are the mahogany-brown needles from the Erupción mine in Sierra de Los Lamentos, about 50 miles south of El Paso, Texas. You'll see these beauties described as endlilchite in the older literature, but they are now called arsenian vanadinite because arsenic caused the brown color.

The Los Lamentos endlilchite forms very slender, pointed needles that are slightly tapered and highly lustrous. They occur in tight clusters that are several inches across. They are very fragile, but when they are undamaged, they are extremely attractive because of their rich color and crystal form. Some of the crystals appear to be hollow at the terminations, a common trait of vandinite.

Endlichite from the Moroccan localities was found in sharp hexagonal crystals up to a half-inch, in tight intergrown clusters. These never appealed to vanadinite collectors as much as the bright-red crystals have.

Vanadinite forms in the upper oxide zones of lead deposits the world over, so it is associated with a large suite of other secondary lead minerals, including pyromorphite (with which it may be confused), mimetite, wulfenite, anglesite and descloisite.

Here in the Southwest, vanadinite has been a collector favorite for decades, since fine specimens are found in quantity. For collectors, Arizona has been a treasure trove of fine vanadinite. Just about every well-known mine in the state has produced quantities of red crystal specimens. Any collector will recognize these sources: Red Cloud, Tiger, 79, Old Yuma, Hamburg, J.C. Holmes, and Gray Horse. This last mine is not well known unless you've been to the Sonora Desert Museum near Tucson.

In the museum's Congdon Earth Science Center, there is a fine collection of Sonora Desert minerals. A faux mine tunnel

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has “pockets” of malachite, wulfenite and vanadinite crystals in the walls, and there is a wonderful replica selenite cave.

The malachite pocket contains a single huge, velvet malachite from the Copper Queen mine in Bisbee. The wulfenite pocket is loaded with bright-yellow, fragile wulfenite blades, which were collected in the San Francisco mine (Sonora, Mexico), a mine I visited when I was on the board of this museum. The selenite cave is filled with 6- to 8-inch selenite blades that were mined for the museum by dealer Benny Fenn.

The vanadinite pocket is lined with red-orange, hoppered crystals up to a half-inch from the Gray Horse mine. These were dug by a team led by Wayne Thompson, local collector/dealer I've known since he was a kid. Collecting these specimens was a real challenge because they are barely attached to the matrix and any vibration or disturbance would cause crystals to shower out of the large pocket being worked. This problem was solved by completely coating the specimens with white, water-soluble glue to hold the crystals in place until they could be extracted in large plates. Soaking the specimens in water removed the glue, and the pristine plates—some well over a foot across—were mounted in the museum tunnel.

The Old Yuma mine—perhaps better known for amazing large, orange-yellow wulfenite blades—is an old gold mine, but collectors knew it as a superb source of fine orange-red wulfenite and bright-red vanadinite. The glory hole produced some nice specimens of both these species. The vanadinite was found with white, bladed calcite—a nice contrast. Wulfenite was also found in the glory hole.

The oddest find happened when a friend of mine was having lunch in the glory hole and spotted a yellow flash on the opposite wall from where he was sitting. He pulled his pistol and fired at the spot. The result was a cascade of broken rock and wulfenite crystals pouring out of the now-open pocket.

The finest vanadinites from the Old Yuma mine were found at the bottom of an incline, where a seam of bright-red hexagons extended many feet into the rock. Local collectors had a field day following that vein, which produced superb specimens in quantity. Today, the Old Yuma is owned by the National Park Service. The agency did not want collecting activities going on so near the western section of Saguaro National Monument, so they blocked access to the Old Yuma property—illegally, it turned out, since it was a valid claim.

The claim holder, my friend Dick Bideaux, came up with a plan that helped him broker a favorable deal with the NPS. He announced his intention to mine gold using the cyanide process. The only way the NPS could prevent it was to buy the mine. A deal was quickly struck and a sale hap-



BOB JONES PHOTO

Some of the Mibladen, Morocco, vanadinites formed tight clusters of 1-inch crystals. (Jones collection)



BOB JONES PHOTO

Vanadinite on contrasting white calcite came from the glory hole at the Old Yuma mine.

pened, and the Old Yuma is now strictly collecting.

World War II, vanadinite became strategically important. Any source of the metal was exploited for use in tank armor and other war materials. One major source of vanadium was in the Four Corners area of the Southwest, where uranium minerals that are rich in vanadium were mined. This is most likely why the North Mesa #5 mine opened in Utah. Bobjonesite, a vanadium mineral, was later found in the mine.

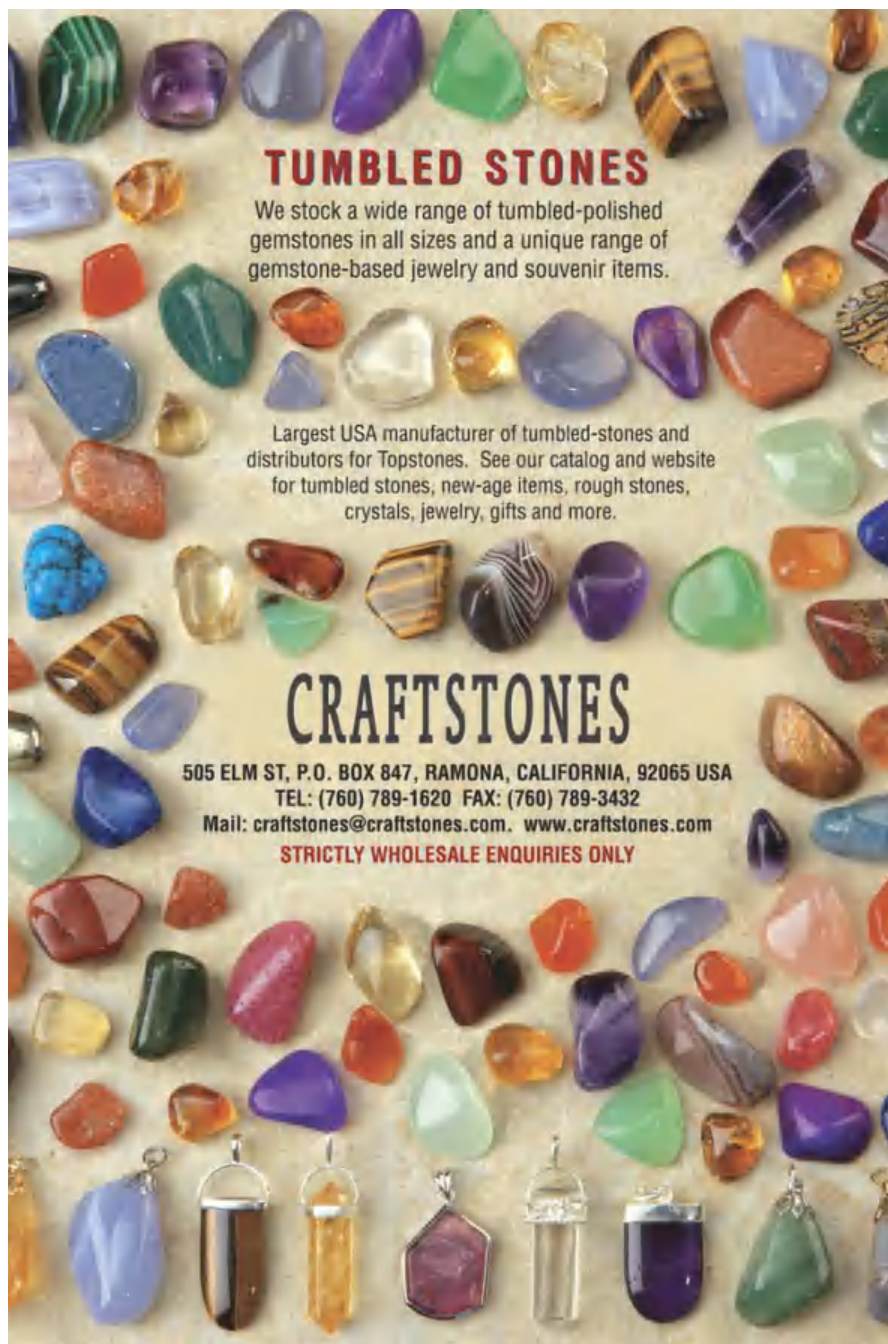
One mine in Arizona that was worked diligently during World War II was the Apache mine, just a few miles northwest of Globe. So many vanadinite crystals were encountered, usually only loosely attached to the matrix, that ore cars loaded with nothing but tons of vanadinite crystals were shipped for the war effort. After the war, this mine became one of Arizona's favorite collecting sites for vanadinite. It was certainly this writer's favorite site.

Within a two-hour drive of Phoenix, the Apache mine was easily reached by car. It was entered via a vertical shaft with ladders. An easy walk along a tunnel—except for some collapsed areas that you had to crawl over—eventually led to a small man-way with ladders that you climbed into a large open stope, where veins of vanadinite were exposed and accessible. If you didn't care to use hammer and chisel, you could simply pick up decent examples of vanadinite crystals on rock fragments from the debris on the floor.

The real prize came when you worked a vein jammed with rock fragments that were completely covered with bright-red crystals. These "floaters" had broken loose from the vein walls due to crustal movement and were later flooded with vanadinite-rich solutions. Some fragments were cemented together by crystals, and sometimes loose crystals poured forth. These specimen-rich veins extended in both directions, so you could follow it up into the vein or down into the floor. The result was always spectacular: flats and flats of fine vanadinite crystal specimens.

We always got more specimens than we needed, to trade and to keep. Our local club had a wonderful policy about that: If you collected more than you needed, you simply took your extras to the next club meeting and put it out so all club members could help themselves. Old folks who could no longer go underground to collect and youngsters not old enough to dig underground benefited from such largess.

Everyone loves colorful minerals and there are few species more colorful than vanadinite. With the great finds in Morocco and the continued collecting activities around the world, vanadinite is still available at a range of prices. Granted, most of us can't afford the Moroccan specimens, but diligent looking at shows will bring something nice to light that you can add to your collection of secondary lead minerals. ♦



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Show Dates *from page 48*

ly for people to bid on. This is a family event with plenty of great activities for the kids. A full snack bar is always open with drinks, hot dogs, chili, homemade sandwiches, and desserts. This event supports the Carmel Valley Gem & Mineral Society's educational outreach for Monterey schools.; contact Janis Rovetti, 1047 Roosevelt Street, Monterey, CA 93940, (831) 372-1311; e-mail: janis12@sbc-global.net; Web site: www.cvgms.com

October 2015

2-4—DEL MAR, CALIFORNIA:

Wholesale and retail show; Gem Faire Inc, Del Mar Fairgrounds; 2260 Jimmy Durante Blvd; Fri. Noon-6 pm, Sat. 10 am-6 pm, Sun. 10 am-5 pm; Students, Adults + Seniors \$7, Children ages 0-11 are free!; Fine jewelry, precious & semi-precious gemstones, millions of beads, crystals, gold & silver, minerals & much more at manufacturer's prices. Exhibitors from around the world. Jewelry repair & cleaning while you shop. Free hourly door prizes.; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: <http://www.gemfaire.com>

2-4—INDIANAPOLIS, INDIANA:

Annual show; Treasures Of The Earth Gem & Jewelry Shows, Indiana State Fairgrounds, Agriculture/Horticulture Bldg.; 1202 E. 38th St.; Fri. 10-6, Sat. 10-6, Sun. 11-5; adults \$5 (3-day pass), children (under 16) free; beads, pearls, gemstones, gem trees, wire wrapping, wire sculpture, silversmiths and goldsmiths, custom work and repairs while you wait, door prizes, classes available, Western jewelry; contact Van Wimmer, Show Director, 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: van@toteshows.com; Web site: www.toteshows.com

2-4—ALBUQUERQUE, NEW MEXICO:

Annual show; Jay Penn, Expo NM ; 300 San Pedro NE, 87108; Fri. 9:00 am-5:00 pm, Sat. 9:00 am-5:00 pm, Sun. 9:00 am-5:00 pm; Admission is Free!; Gem & Mineral show in the Creative Arts Bldg. @ NM State Fairground (Expo NM). Enter Gate 3 @ San Pedro & Copper (west side of the fairgrounds). FREE ADMISSION. 60+ dealers, gemstones, mineral specimens, rough, slabs, jewelry, beads, cabochons, fossils, tools. Contact Jay Penn, 505-883-4195, jaypenn246@gmail.com. Website: abqfallshow.wix.com/abq-fall-show; contact Jay Penn, 2324 Alvarado NE, Albuquerque, NM 87110, (505) 883-4195; e-mail: jaypenn246@gmail.com; Web site: abqfallshow.wix.com/abq-fall-show




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2-4—CLARKDALE, ARIZONA: Annual show; Mingus Gem & Mineral Club, Elks Club Lodge, Clarkdale, Arizona; 100 S. Broadway; Fri. 9:00 am-5:00 pm, Sat. 9:00 am-5:00 pm, Sun. 10:00 am-4:00 pm; Adults \$2, Children are Free with Adult; contact Amy Joe, (505) 204-6881; Web site: www.mingusclub.org

3-4—VISTA, CALIFORNIA: Annual show; Vista Gem & Mineral Society, Antique Gas & Steam Engine Museum ; 2040 N Santa Fe Ave; Sat. 10 am-5 pm, Sun. 10 am-4 pm; Admission is Free!; contact Ray Pearce, (760) 535-5524; e-mail: vistarocksgms@gmail.com; Web site: Vistarocks.com

3-4—SPRINGFIELD, ILLINOIS: Annual show; Lincoln Orbit Earth Science Society, Illinois Building; IL State Fairgrounds, 801 Sangamon Ave; Sat. 10:00 am-6:00 pm, Sun. 10:00 am-5:00 pm; Adults \$2.00, Seniors \$1.00, Children are Free; Mineral, fossil, gem, jewelry, geode and used equipment dealers, club member and special exhibits, live demonstrations, concessions stand, silent auction, spin and win and kid's activities, gem flume and outdoor swap; contact Ed Wagner, (309) 838-7782; e-mail: loesseditor@gmail.com; Web site: Facebook us

3-4—OMAHA, NEBRASKA: Annual show; Omaha Mineral and Gem Club, Westside Community Center; 3334 S 108th St, (108th and Grover); Sat. 9:00 am-6:00 pm, Sun. 10:00 am-5:00 pm; Adults \$5, Seniors \$3, Students \$3, Children under 12 Free with adult; The Omaha Gem and Mineral Show includes dealers and demonstrators from around the Midwest, games and activities for adults and kids both. Check out the Wire Wrap and Jewelry artists, Rock painters and carvers, Flint Knapper and learn how to polish and create unique gemstones from rocks. Buy that one of a kind gift or collectible or check out the custom designed jewelry and the unique specimens available from our 9 dealers. Learn how to identify fossils and gemstones in our gem and fossil digs. Race a rock or try your hand at the wheel of fortune or silent auction. Lots of fun for adults and kids both.; contact Allan Jeanneret, 7287 N Rd, Nebraska City, NE 68410, (402) 873-6515; e-mail: tjeanneret@hughes.net; Web site: www.nerockgem.org

3-4—JEFFERSON, WISCONSIN: Annual show; Rock River Valley Geological Society, Jefferson County Fair Park ; Jackson & Peurner Rd.; Sat. 10:00 am-5:00 pm, Sun. 10:00 am-4:00 pm; Admission = Free/

continued on page 66

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Teri Smith has a knack for getting landowners to open up collecting sites on their properties and shares the wealth through guided field trips.

FIELD TRIP FACILITATOR **TERI SMITH**



I nicknamed this slab of classic Walker Ranch flower garden jasp-agate *The Breadloaf* because of its dimensions and the slices it yielded.

Texas Collecting Areas Open Up for Her

Story and Photos by Johnny French

My friend Teri Smith is a long-time motel owner and self-confessed field trip facilitator in Alpine, Texas. She convinces landowners to admit rockhounds to their properties in return for her guarantees that said rockhounds will, under her personal direction, follow the landowners' rules, pay the landowners reasonable fees, sign waivers holding the landowners free from liability for allowing entry, and carry insurance to that effect via membership in the Rollin' Rock Club (RRC) or a similar organization.



In April 2013, Teri Smith found The Peacock, the biggest and best banded agate I've ever seen from the Walker Ranch.



Only the shape and a bit of white patina betray the presence of this aptly-named brown-skinned iris agate nodule on the Walker Ranch.

Neither the landowners nor the rockhounds pay her for her services, but she is content to go rock hunting for free, often for more than 50 days a year.

Back when I began rock hunting in West Texas, 40 years ago, there were only a couple of ranches—the Stillwell Ranch south of Marathon and the Woodward Ranch south of Alpine—that catered to rockhounds, and neither led their clients into the field.

Later, the Woodward Ranch offered, by prearrangement, field trips to Needle Peak, where rare green moss and pompom agate could be found, and to a couple of ranches owned by others south of Marfa, where the principal objective was to find the rare bouquet agate. Conflicts with those other landowners eventually led to the public's loss of access to the bouquet agate beds. More recently, the majority of the Woodward Ranch was sold, and the rest—including the Needle Peak property—is currently for sale.

Other opportunities for rock collecting opened up in conjunction with the gem and mineral shows held each April at the Alpine Civic Center. But again, there arose between the show's field trip organizers and the landowners problems that, unfortunately, closed a couple of remarkable collecting sites, the Big Hill Ranch and Bullfrog Mountain, perhaps forever.

Teri facilitates the interaction between the hobbyists and the working ranches to open new territories and to avoid losing the old ones. For example, she made and maintains the proper connections for access to a new bouquet agate bed location.

I pray that, someday, we'll also get back to collecting on the Big Hill Ranch and on Bullfrog Mountain, both of which are within 10 miles of Alpine. If anyone can convince the landowners to accept our money and to tolerate our company again,

I know she'll be the one to arrange the reunion.

All Teri's field trips begin in the parking lot of her motel, the Antelope Lodge, located on U.S. Highway 90, west of town. Inside the lodge's office, participants sign their waivers, pay their fees, get an RRC membership if necessary, and receive any instructions (written or verbal) the landowner wants them to follow.

They may also take the time to visit Teri's little attached museum and rock shop to get a look at what they may be collecting. (By all means, if you have an hour or so, watch the museum's continuous slide show of the most beautiful local gem specimens and the scenery of the areas where they were found.)

The shortest field trip she offers is to the Ritchie Ranch on Alpine's southeastern outskirts. The material found there is mainly agate and jasper float that has washed down out of the mountains. Pieces worth collecting vary from pebble-size to those you'd need a forklift to carry away. Some years ago, Teri found cracks extending several feet down into the bedrock, lined with sheets of small amethyst crystals.

About 20 miles south of Alpine, on the west side of state Route 118, is Teri's five-star site, the Walker Ranch. It's only accessible a couple of times a year, one of which generally coincides with the April Alpine Show, hosted by the Chihuahuan Desert Gem & Mineral Society. T

he Walker Ranch provides everything the better-known, but now-closed, Woodward Ranch featured: plume nodules in red, black, yellow, and other colors; flower garden jasp-agates; moss agates; banded agates; sagenite agates; orbicular (a.k.a. peanut) agates and jaspers; other jaspers; amethyst-lined geodes; pseudomorphs after aragonite and calcite; and facet-grade, yellow labradorite phenocrysts.

In the last couple of years, Teri has led us to a particular ridge on the ranch that consists of an outcrop of Sheep Canyon basalt, the Mother Lode of clear to pastel-colored banded agates. The late Frank Woodward Jr. called them "brown-skinned iris agates" (BSIAs). Both the basalt and the BSIAs are very hard, so much so that when they are embedded in the host rock, the agates are next to impossible to break free. Once weathered loose, some of the brown matrix usually adheres to the nodule, hence the name.

The broken surfaces of the nodules, on the other hand, grow a white patina, making them relatively easy to find among the broken pieces of basalt. While they are normally smaller than fist size, Teri found one BSIA well over a foot in diameter with magenta, white and purple eyes. I named it The Peacock.

For those unfamiliar with the term, "flower garden jasp-agate" consists of parallel rows of what Frank called "micro-plumes" made of often bright and varicolored jasper set in clear agate. "Micro plume" refers to the internal makeup of the jasper, not to each "flower's" size, which can be inches long. Most of the Bird Hills, in the vicinity of the Woodward and Walker ranches, have deposits of flower garden in ledges and float that has eroded from layers several dozen feet below the plume nodule host rock, so both are often found mixed together at the feet of those hills.

Some folks actually prefer flower garden to the plumes, perhaps because the former frequently is found in fist-size, blocky chunks. The best piece I ever discovered was filled with large yellow and orange flowers. Only one tiny corner lay exposed at the foot of Agate Hill on the Walker Ranch. When dug it up, however, I dubbed it The Breadloaf because of its actual size and shape.



On the Ritchie Ranch, Teri found a huge amethyst seam extending several feet down into the bedrock. The full size of it is unknown.



These agate nodules were found on Bullfrog Mountain, a few miles east of Alpine. The collecting site is no longer open to rockhounds.

The plume nodules are definitely the most recognized of the Walker Ranch's attractions and, although they average much smaller than pieces of flower garden, they are more abundant. On rare occasions, pieces can weigh several pounds. On one hill in particular, nodules and pieces of the larger nodules have been discovered. The largest piece of black-and-red plume agate I can remember Teri finding barely fit into my pack so I could tote it to her car.

The littlest ones are much more to my liking, for they tumble very well, revealing lots of interesting eyes, sagenite sprays, and other patterns, in addition to the plumes. Some come in the perfect size and shape to be wire-wrapped once they're tumble polished.

Tumbling whole larger nodules, commonly called "biscuits" and "potatoes", with coarse grit is also the best way to discover which way to saw them to orient the plumes for slabbing and cabbing. Conventional wisdom says to saw each biscuit parallel to its flattest side, but the flaw in this method is that the plumes from one part of the two-layered nodule deposits run at right angles to that flat side. It's better to tumble a window into each nodule to see which is which.

Recently, a friend who wire wraps asked me to experiment with leaving some of the nodules unfinished whenever the rough grit stage revealed good examples of plumes, bull's-eyes, sagenite sprays, or other treats just beneath their skins. He's going to grind and/or saw these "preforms" to shape as necessary, polish the results, and finish them as wrapped gemstones.

This year, Teri facilitated another site, named the South Larremore Ranch, about 50 miles south of Alpine on the east side of state Route 118. This site is nearly flat and owes its collectible materials primarily to its alluvial nature. Calamity Creek runs south through the Woodward and Walker ranches before crossing this ranch, so it's no surprise that what one finds on those two ranches appears in and to either side of that creek at the South Larremore Ranch. This includes plume nodules and speckled, striped, flower garden, and peanut jasp-agates. Also scattered about are pieces of petrified wood. One of my friends collected four Native American artifacts, including the only adze I've ever seen. At a different site away from the creek, one can find concretions, marine fossils, flint, and various colors of agate.

About 100 miles south of Alpine is the East Needle Peak Ranch field trip location. It's adjacent to Big Bend National Park, on the flats and foothills surrounding Well Creek. This is where the lucky rockhound finds the famous green moss agate with the yellow pom poms; Teri picked up a 20-pound piece last winter.

And yes, it can get very hot; although she led a trip there in April, winter is really the best time for venturing to East Needle



East Needle Peak Ranch is the source of green moss, pom pom, and pseudomorph agates, sometimes found in the same rock.



Brown matrix usually adheres to the clear to pastel-colored banded agates that Frank Woodward Jr. called "brown-skinned iris agates".

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Most of the Bird Hills, in the vicinity of the Woodward and Walker ranches, have deposits of flower garden jasp-agate. This is Teri's five-star site.

Peak. If you make the journey in April, take solace in the fact that they make great ice cream milkshakes at the store in Study Butte, on the way back to Alpine. East Needle Peak Ranch has fossil shark and ray teeth, other marine fossils, petrified wood, artifacts, moss and banded agate, and fantastic pseudomorphs, including agate after calcite and aragonite crystals and hematite after pyrite cubes.

The last, but not least, of Teri's facilitations are her field trips to the Singleton Ranch. This ranch lies southwest of Alpine as the crow flies, but is accessed by driving west to Marfa, and turning south and then east, making the trip an estimated 40 miles to the ranch gate. This ranch is covered in chalcedony and other silicates in some places, so one must be very selective in what to collect.

The possibilities include ruin agate, common opal, pseudomorphs after aragonite and calcite, botryoidal agates, and banded agates, but the main prize is the variety of nodular plume agate called bouquet agate. Frank once told me that to acquire bouquet agate, one must select the ugliest material in sight.

Actually, the best method I've found is to walk along examining all the little rough nodules for breaks that reveal the plumes. Chances are that one will find similar plumes among the surrounding unbroken agates.

Most bouquet plumes are white or black, but some have pastel shades of pink, yellow, orange, and even blue or green, all mixed together. Tumbling to remove the coarse, opaque exteriors pays off as well for bouquet agates as it does for the Bird Hills plume nodules.

Although I've mentioned the Stillwell Ranch, your trip there would be self-facilitated; it is not one of Teri's destinations. It recently changed ownership, but reportedly still admits rockhounds for fee collecting.

Different types of material can be found at separate sites: small banded agates with a white patina on some hillsides and piles

of float full of jaspers, moss agates, and petrified woods on others. I remember it best for the piece of ammonite cast in clear gray chalcedony that I found there and the full-grown, blue-green, male collared lizard, a.k.a. mountain boomer, I saw running away on its hind legs. Shades of *Jurassic Park*!

Another destination that is not on Teri's field trip list, because it's not a private ranch destination, is on the gravel-surfaced county roads that cross FM 2903 between Balmorhea and Toyah, north of Alpine. Here you can look for Balmorhea blue agate. Much of the gray-to-blue agate found on the roads has a white patina and may contain bands and/or plumes in black and/or white.

Other road material includes large chunks of white common opal, jaspers, moss agates, and petrified wood. Teri also found a small, but beautiful, banded agate reminiscent of a Mexican Laguna agate on the county road. Perhaps she'll facilitate an arrangement with the adjacent landowner someday, but for now, collectors should stay within the county's right of way.

I must mention that, in connection with the multiday spring and fall field trips to the Walker Ranch, there's a sort of tradition that on one Sunday the Antelope Lodge hosts a barbeque for the rockhounds. A few years ago, I began bringing smoked ham and brisket to this supper to show my gratitude for Teri's years of service to our hobby. Teri announced that I've become the *rockhound* facilitator. We fed a lot of folks again last April 19, and if I can attend the next supper in October, I'll facilitate more meat to the lodge's picnic tables.

You can find out more about the field trips at Teri's Web site, <http://terismithrockhunts.com/>. The Alpine Chamber of Commerce can provide a list of places to stay in town, and there are dry camping areas on the Walker Ranch. On account of the convenience, I have for years stayed at the Antelope Lodge (www.antelopelodge.com/index.htm). ♦



Tumble polishing reveals the patterns and colors of Walker Ranch agate nodules.



Some Singleton Ranch bouquet agate nodules show internal plumes.



The Walker Ranch has several outcrops of orbicular (a.k.a. peanut) jasper and agate.

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WHAT TO CUT

by SCOTT EMPEY

Willow Creek Jasper

Willow Creek jasper—I think I can say without reservation—is one of the finest porcelain jaspers in the world. It is one of a handful fine-grained jaspers that are highly prized by collectors and gem cutters for their excellent colors, fine patterns, density and hardness, and the glossy porcelain finishes they take when polished.

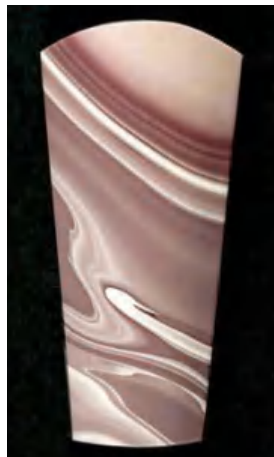
The material has so much variety in terms of color and pattern that it is a little hard to describe. I've cut pieces that resemble Morrisonite, Imperial and Bruneau jaspers. I once saw a pattern that looked exactly like swirls of cream in coffee. Some pieces have streaming patterns, bands, swirls and orbicular patterns; the best of it can have all of these at once.

The color range is vast: green, pink, red, blue, purple, yellow, orange—the list goes on and on. Often, the colors are in pastel shades, but sometimes they have a deep, saturated quality. When it comes to Willow Creek just about anything can happen.

The Willow Creek mine is located on privately owned land about 15 miles north of Eagle, Idaho (northwest of Boise). It is currently owned and operated by Larry Ridley, and it has been producing gorgeous material for over 40 years. When I go to the Quartzite show, Larry's is the first booth I hit, as the very best slabs tend to sell right away.

The jasper is found inside of large nodules, called "thunder eggs", that are surrounded by a hard rhyolite. You usually think of a thunder egg as being something you can hold in your hand, two hands at most. Some of the big eggs from the Willow Creek would probably crush my truck—the largest are over 10 feet in diameter—although the best jasper comes from eggs around 3 feet to 4 feet in size.

The eggs are broken up using gads and sledgehammers to free the jasper centers. In a good year, the total yield from all this hard work is around 2,000 pounds, and a lot of rock has to be moved to get this amount. Only about one in 10 eggs has the jasper, and only a portion of that is the



high-grade material sought after by lapidaries.

Willow Creek is really a pleasure to cut; in general, it is a nice, hard, compact jasper. It tends not to have many internal fractures, and those that do exist are pretty easy to spot.

It is one of those materials that tend to chip out along the edges when working on the more aggressive metal-bonded wheels, like the 100 and 260 disks that I use for initial shaping, but it is not problematic.

Just rough out your blanks

about a millimeter larger on all sides than you want your stones to end up. Then do your final edge shaping on something less jarring, like a 220 resin bond wheel or belt, and proceed through the finer grits as usual, finishing with a worn 1200 belt or a finer grit like 3000, if you've got it.

When I have arrived at my final shape and dome and am ready to polish, I moisten my polishing wheel and apply my polishing compound as a paste. I polish all surfaces at a medium-slow speed, making sure to roll slightly over all the edges to get complete coverage and get a decent polish going.

As the wheel dries out, it is time to engage what I call "The Kicker" to get that glossy, "wet" look. At the point when making a pass with the stone over the wheel no longer leaves a film of compound, but a clean, polished surface, slow the wheel down a bit and make one complete pass over the whole surface of the stone, starting on one side and going from front to back, then coming from the other side the same way, then the back and the sides.

The window for this operation is short, but with quick hands you should be able to cover the whole surface before it dries out too much and stops leaving the glossy, burnished surface. 💎

Scott Empey, owner of Gerard Scott Designs, creates hand-cut gemstones, designer jewelry, and props for the motion picture industry. His Web site is www.gerardscottdesigns.com.





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9-11—HILLSBORO, OREGON:

35th Annual Gem and Mineral Show; Portland Regional Gem and Mineral Association, Washington County Fair Complex; 873 NE 34th Avenue; Fri. 10 am-6 pm, Sat. 10 am-6 pm, Sun. 10 am-5 pm; Adults \$5, Children 12 and under free with paying adult; 40+ vendors of fossils, rocks, gems, minerals, tools, jewelry, beads and more. Kids corner with games & activities. 100 exhibits of fossils and finished lapidary arts to learn about diversity of rocks and minerals. Speaker presentations from authors of geology, fossils, and rock collecting. 10+ demonstrations in cutting precious stones, wire wrapping, cabochons, etc. Door prizes, win a bargains at the silent auction. ; contact L. Smith, PO Box 5401, Portland, OR 97228; e-mail: Portlandregional.Dealerchair@gmail.com; Web site: www.PortlandRegionalGemandMineral.com

9-11—WARREN, MICHIGAN:

Annual show; Michigan Mineralogical Society, Macomb Community College ; 14500 E. 12 Mile Rd, S. Campus Expo Center; Fri. 9:00 am-6:00 pm, Sat. 10:00 am-7:00 pm, Sun. 11:00 am-5:00 pm; Adults \$8, Seniors +62 \$5, Children ages 5-17 \$4; The 71st Annual Greater Detroit Gem, Mineral, & Fossil Show, presents one of the largest collection of gems, minerals, & fossils in the Midwest. This year's theme: "A RAINBOW OF CRYSTALS." This family friendly and educational show features displays from internationally renowned universities, museums, and collections. This very exciting show is for the beginning collector to the experienced collectors. Over 60 dealers and vendors offer specimens, lapidary supplies, jewelry, collecting supplies, & printed materials. Lectures and demonstrations take place throughout the weekend. Please check www.michmin.org after April 2015, for updated show information including new author book signings, new university listings, and other exciting events that will take place. School tour information can be obtained at joodiddy13@yahoo.com Vendor information can be obtained at mydirty paw-dog@yahoo.com ; contact Patricia Graves-Wesolosky, 1151 Yule Rd, Leonard, MI 48367; e-mail: mmsgeograves@hotmail.com; Web site: www.michmin.org

9-11—MOAB, UTAH:

Annual show; Moab Points and Pebbles Club, Old Spanish Trail Arena; 3641 S Hwy 191, 5 miles S. of Moab; Fri. 10 am-6 pm, Sat. 10 am-6 pm, Sun. 10 am-4 pm; Admission is Free!; Show has dealers, displays, spin table, door prizes and more. Field Trips leave the arena 9 a.m.

continued on page 68



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Show Dates from page 68

Sat.-- Yellow Cat area for Yellow Cat Redwood limb casts, agate petrified wood etc. Sun. Dubinky Well area. purple Dubinky agate etc. No dogs allowed inside the arena please!; contact Jerry Hansen, PO Box 1459, Moab, UT 84532; e-mail: moabrockclub@live.com

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10-11—TOPEKA,, KANSAS: Annual show; Topeka Gem & Mineral Society, Inc., KS Expocentre AG Hall; 17th & Topeka Blvd.; Sat. 10 am-6 pm, Sun. 10 am-5 pm; Adults \$5, Students \$1 (13-17), Children under 13 free w/adult; Dealers, Demonstrators in wire wrap and silversmithing, 4-H Displays, silent auctions, lapidary supplies, grab bags, and door prizes. Web www.topekagemandmineral.org or contact M. Mowry rock2plate@aol.com 785-267-2849 Dealer inquiries welcome.; contact Millie Mowry, 1934 SW 30th St, Topeka, KS 66611-1917, (785) 267-2849; e-mail: rock2plate@aol.com; Web site: www.topekagemandmineral.org

10-11—MARYSVILLE, WASHINGTON: Annual show; Marysville Rock and Gem Club, Totem Middle School ; 7th Street and State Avenue ; Sat. 10:00 am-5:00 pm, Sun. 10:00am-5:00 pm; Admission is Free; Marysville Rock and Gem Club Presents The 41st Annual ROCKTOBERFEST 2015 Gem

and Mineral Show The show will have rocks from all over the world. There'll be dealers with rock rough, slabs, and polished cabs to gem quality faceting rough; minerals, fossils, tools, and lapidary equipment; jewelry, beads, gems and books. There will be demonstrators, jewelry artists, club displays, and youth games. Door prizes every half hour, silent auctions, raffle prizes and food service. Free admission, free parking. For more information, check us out on facebook: Marysville Rock and Gem Club ; contact Brian Murril, WA; e-mail: bmurril@aol.com

10-11—WALNUT CREEK, CALIFORNIA: Show and sale; Pacific Crystal Guild, Civic Park Community Center; 1371 Civic Drive; Sat. 10:00 am-6:00 pm, Sun. 10:00 am-4:00 pm; Adults \$8, Children are Free; Get ready for THE FALL CONTRA COSTA CRYSTAL FAIR which includes a magical mix of crystals, minerals, beads, and jewelry. Whether it's stone beads from Nepal, amethyst geodes from Madagascar, jade from China, or jewelry from northern California artisans –you'll find it at the Crystal Fair at below market prices. You'll also find an aura camera, tarot reader, sound healer, massage therapist, reiki master and many others – 30 booths in all. The exact location is the Civic Park Community Center at 1375 Civic Drive at Broadway in Walnut Creek. The hours are 10am to 6pm on Saturday, October 10; and 10 am to 4 pm on Sunday, AOctober 11. Admission is \$8 (under 12 free). There is plenty of free parking and the downtown Walnut Creek BART station has a shuttle to Civic Park. For info: Jerry Tomlinson at (415) 383-7837 ; contact Jerry Tomlinson, PO Box 1371, Sausalito, CA 94966, (415) 383-7837; e-mail: jerry@crystalfair.com; Web site: www.crystalfair.com

10-11—SIERRA VISTA, ARIZONA: Annual show; Huachuca Mineral and Gem Club, Cochise College; 901 N. Colombo Ave; Sat. 9 am-5 am; Admission is Free; 41st Annual Gem, Mineral, and Jewelry Show. Free admission, free parking, handicapped accessible, child friendly. Vendors inside and outside. Largest selection of geodes around (reasonable prices and free cutting with purchase). Raw and finished stones, finished jewelry, jewelry-making supplies, beads, and lapidary supplies. Hourly raffles (proceeds go to scholarship/educational funds).; contact Maudie Bailey, 5036 S. San Carlos Avenue, Sierra Vista, AZ 85650, (520) 378-6291/(520) 249-1541; e-mail: gmbailey@msn.com; Web site: huachucamineralandgemclub.info

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11-11—FALLBROOK, CALIFORNIA:

Annual show; Fallbrook Gem and Mineral Society, Fallbrook Gem and Mineral Museum; 123 W. Alvarado St.; Sun. 9:00 am-4:00 pm, Daily -; Free, Free, Free, Free; The Fallbrook Fall Festival of Gems and Minerals will be held on October 11, 2015, by the Fallbrook Gem and Mineral Society. The event will feature: gem, mineral, and fossil vendors; panning for minerals; geode cracking; gem identification; raffles; and more. Vendors will sell a variety of gems, minerals, fossils, jewelry, and related items. The Fallbrook Gem and Mineral Society Museum will be open (admission is always free) during the show. Food and drink will be available for purchase. The Fall Festival will take place on W. Alvarado Street (the street will be closed to traffic between Main and Pico Avenues) at Main Avenue, in downtown Fallbrook, California. ; contact Mishell Rose, 123 W. Alvarado St., Fallbrook, CA 92028, (760) 728-1130; e-mail: fgms@sbcglobal.net; Web site: www.fgms.org

16-18—COSTA MESA, CALIFORNIA:

Wholesale and retail show; Gem Faire Inc, OC Fair & Event Center; 88 Fair Dr; Fri. Noon-6 pm, Sat. 10 am-6 pm, Sun. 10 am-5 pm; Students, Adults + Seniors \$7, Children ages 0 - 11 are free; Fine jewelry, precious & semi-precious gemstones, millions of beads, crystals, gold & silver, minerals & much more at manufacturer's prices. Exhibitors from around the world. Jewelry repair & cleaning while you shop. Free hourly door prizes. ; contact Yooy Nelson, (503) 252-8300; e-mail: info@gem-faire.com; Web site: <http://www.gemfaire.com>

16-18—FORT WAYNE, INDIANA:

Annual show; Three Rivers Gem & Mineral Society, Allen County Fairgrounds; 2726 Carroll Road; Fri. 10:00 am-6:00 pm, Sat. 10:00 am-6:00 pm, Sun. 11:00 am-5:00 pm; Adults \$5.00, Seniors \$3.00, Students \$1.00, Children 12 and under free; Attractions: gem, mineral, fossil and jewelry dealers, lapidary arts demonstrations, Viking Knit classes, exhibits, geode cracker, gem sluice, kid's games, door prizes, silent auction, fluores-

continued on page 76



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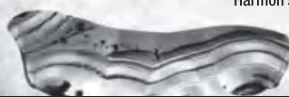
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NEWS and REVIEWS

2015 CFMS Golden Bear Awards

Over the past 79 years, the California Federation of Mineralogical Societies (CFMS), a regional umbrella organization governing some 120 local gem and mineral societies across California, Arizona and Nevada, has awarded 68 Golden Bear Awards to outstanding individuals and couples within the federation. At its June Show and Convention in Lodi, the CFMS awarded the 2015 Golden Bear to two of its members.

Jim Brace-Thompson was recognized for outstanding lifetime service from. Jim is a contributing author to *Rock & Gem* magazine and the Juniors Program Chair of the American Federation of Mineralogical Societies (AFMS). He is a past President and Juniors Chair of the CFMS, past President of the Carmel Valley Gem & Mineral Society, and Museum & Educational Outreach Chair and past President of the Ventura Gem & Mineral Society in California.

In the award ceremony, Jim was cited as "a driving force in CFMS since 1998". He single-handedly developed and has maintained an outstanding juniors program, the AFMS Future Rockhounds of America Badge Program, which he updates and expands every four years to incorporate user feedback and suggestions.

Jim sat on the CFMS Executive Board from 2007 through 2011, serving in turn as Secretary, 2nd Vice President, 1st Vice President, and President, and he serves as the CFMS Liaison with the Natural History Museum of Los Angeles County. In 2014, he was inducted into the National Rockhound and Lapidary Hall Fame in the Educational Category, largely for his efforts with the AFMS Badge Program and his monthly *Rock & Gem Kids* contributions.

Betty Eggar, a member of the Amador County Gem & Mineral Society, Calaveras Gem & Mineral Society, Stockton Lapidary & Mineral Club, and the Mother Lode Mineral Society, was also awarded the Golden Bear because of her outstanding service to the CFMS.

Betty started as a lapidary student at Camp Paradise and Zzyzx, and went on to assist Bural LaRue with the Lost Wax Casting class at Camp Paradise. She also taught Copper Enameling and Alternate Casting Methods at Zzyzx.

Betty has supported the CFMS Earth Science Studies program as an instructor and a demonstrator at society shows. She opens her home to students every Friday to teach classes when the club does not have classes. Betty goes to classes to learn new lapidary skills and brings back the knowledge to teach to the members.



Jim Brace-Thompson (left)



Betty Eggar (far right)



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24-25—BELLEVUE, WASHINGTON: Rock, Gem and Jewelry Show; Bellevue Rock Club, Vasa Park; 3560 West Lake Sammamish Blvd SE; Sat. 10 am-6 pm, Sun. 10 am-5 pm; Admission is Free; contact Bruce Himko, PO Box 1851, Bellevue, WA 98009, (425) 957-1284

24-25—LOS ALTOS, CALIFORNIA: Annual show; Peninsula Gem and Geology Society, Los Altos Youth Center; One No. San Antonio; Sat. 10 am-5 pm, Sun. 10 am-5 pm; Admission \$4.00, Children \$2.00; contact Steve Jobe, (408) 834-5384; e-mail: steve_job@sbcglobal.net; Web site: http://pggs.org/

October 2015-November 2015

30-1—BOISE, IDAHO: Wholesale and retail show; Gem Faire Inc, Expo Idaho; 5610 Glenwood; Fri. Noon-6 pm, Sat. 10 am-6 pm, Sun. 10 am-5 pm; Students, Adults + Seniors \$7, Children ages 0-11 are free!; Fine jewelry, precious & semi-precious gemstones, millions of beads, crystals, gold & silver, minerals & much more at manufacturer's prices. Exhibitors from around the world. Jewelry repair & cleaning while you shop. Free hourly door prizes. ; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: http://www.gemfaire.com

31-1—OKLAHOMA CITY, OKLAHOMA: Show and sale; Oklahoma Mineral & Gem Society, Oklahoma State Fair Park; 3001 General Pershing Boulevard; Sat. 10:00 am-6:00 pm, Sun. 10:00 am-5:00 pm; Adults \$6.00; contact Dale Moore, 12352 Spring Cir, Guthrie, OK 73044, (405) 834-0765; e-mail: HALFFULL101-ROCKNGEM@YAHOO.COM; Web site: HTTP://OMGS-MINERALS.ORG

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ON THE ROCKS

by BOB JONES

Youth in Action: The 2015 Ogden Show

In mid-April, Carol and I enjoyed visiting the Northwest Federation Regional Show, hosted by the Golden Spike Gem & Mineral Society of Utah. It was great seeing old friends and having a chance to enjoy a lot of fine Utah minerals on display. One display of Bruneau jaspers was particularly nice, as the specimens showed the amazing, contrasting shades of brown for which Utah is famous. Another fine display had specimens of the many types of the better-known minerals of Utah, like variscite and jasper.

One display I was particularly interested in studying contained the very fine lapidary work of students from Fremont High School. The students had created lovely pendants, rings, pins and bracelets, demonstrating great skill in their work. It was very refreshing to see such fine work done by youngsters who are the future of our hobby!

Speaking of youngsters, the club had designated Friday as a school visitation day, and by 9 a.m., busloads of students were lining up to enjoy the show. I did not get an official accounting, but the club averages some 5,000 student visitors each year. The aisles were crowded with excited kids checking out the dealers, watching the demonstrators, and enjoying the many displays.



Visitors were quite anxious to actually rub the pebbly surface of the fossilized skin of a dinosaur.

One feature of the show is Mr. Bones, a.k.a. Tim Seeber. He replicated a *Tyrannosaurus rex* skeleton in foam rubber some years ago to use as a Halloween costume. It was such a hit that he now hires out at mineral and fossil shows and walks the floor in the costume, to the delight of the kids. He has the ability to lower the skeleton's head so the swinging jaw engulfs a child as if the dinosaur was about to eat the subject. Kids either love it or shy away, but once Mr. Bones engulfs a boy or girl, the shy ones sidle up, sort of hoping they

get "eaten" next. Cameras click and parents smile as their child poses with this remarkable showstopper.

Seeber has also made puppets of a saber-toothed cat and a couple smaller dinosaurs that he walks around the show. Mr. Bones has been a regular fixture at the September Denver Gem & Mineral Show for years and has become so popular that he has a full calendar most of the year. Watch for him at your local show.

The Denver show is put on by the Greater Denver Area Gem & Mineral Council, which is made up of eight clubs: Colorado Mineral Society (Lakewood), Denver Gem & Mineral Guild (Golden), Flatirons Mineral Club (Boulder), Friends of Mineralogy, Colorado Chapter (Denver), Littleton Gem & Mineral Society (Littleton), Mile High Rock & Mineral Society (Westminster), North Jeffco Gem & Mineral Club (Arvada), and Western Interior Paleontological Society (Denver).

There was a wonderful assortment of activities that visitors could enjoy. Many of the youngsters—in particular young girls—rushed to talk to Bailey Jo Worsley, Miss Rodeo Utah. She is a delightful young lady who was most accommodating, as dozens and dozens of kids crowded around her table each day she was there. She gave each of them a color photo personalized with her autograph. For many young ladies it was the highlight of their visit.

One important effect of having school kids visit a show is they go home and insist



Mr. Bones lowers his *T. rex* jaws over Miss Rodeo Utah, while youngsters crowd around to wait their turn.

that their parents take them back to the show on the weekend. At the federation show in Ogden, this was particularly evident, as crowds of families dominated the weekend show attendance.

The range of demonstrators at the Ogden show was remarkable. One fellow sat knapping arrowheads, which visitors found fascinating. Others made cabochons, faceted stones, or cut and polished slabs. Several very good lapidary machines were in constant use as fine work was being done to demonstrate our hobby. At another table, visitors could actually handle fossilized dinosaur bones. Again, volunteers were there to answer questions from visitors. Visitors were quite anxious to actually rub the pebbly surface of the fossilized skin of a dinosaur.

Not surprisingly, there was a silent auction going on. I checked out some of the material and felt many pieces were well worth a bid. The club also offered door prizes, and again the prizes were very respectable—certainly some of the finer door prizes I've seen at a show.

One of the areas that got plenty of action with the kids was put on by Fossil Basin, an organization that manages an area well known for fossils. The state of Utah has a large number of fossil-animal beds, in which every creature from fish to dinosaurs has been found and are still being unearthed from a range of sedimentary beds that dominate the state's landscape. Who has not heard of Arches, Bryce Canyon, and Zion national parks?

These are just the major examples of sedimentary formations for which Utah is famous, and sedimentary rocks are home to the vast majority of fossils found. A standing joke among Utah collectors is that anyone who prospects for gold is wasting time. That is, of course, not true as they were several active gold mines just north of Salt Lake City decades ago.

Fossil Basin is one of the better-known fossil sites in Utah. Fossil Butte National Monument is located within the Basin, and there are several established quarries where marvelous fossil fish are found. Located near Kemmerer and Diamondville, these sedimentary formations have produced so many that they appear in gift shops across the nation. Collecting on-site is allowed for a fee. It was appropriate that the Northwest-Golden Spike Show have a booth set aside for Fossil Basin. Children enjoyed doing rubbings of fossil images. The fine assortment of free literature available included a coloring book, pictures, and a wall poster of a fossil.

Just across the aisle was a gem hunt table—this is always a hot spot for kids. There were two piles of rock fragments on a table in which small pieces of topaz, sapphire, garnet, and the like were buried for kids to find. I never did walk by that table without having to squeeze through the crowd of kids *and* adults!



One display case contained the very fine lapidary work of students from Fremont High School.

While at the show, I did attend some meetings. These meetings are critical as they maintain communication among the many clubs that make up the regional federation. The federation has a host of committees, each responsible for an important aspect of the mineral-collecting hobby. For example, the Public Lands Advisory Committee keeps an eye on the federal departments responsible for managing the federal lands on which we are able to collect. Any changes in the status quo on federal lands that might affect collecting are examined. The findings are shared with clubs, and action is taken to protect our access to these collecting areas.

Out of this type of committee, another organization was formed: the American Land Access Association (ALAA), which is the driving force behind many of the actions taken by federation groups to protect our collecting rights. Members of this organization meet with the Bureau of Land Management and Forest Service and other agencies to educate them about the hobby and work with them to protect our collecting rights.

Another committee has worked tirelessly with the Postal Service for the publication of stamps featuring American minerals and gems. This committee, over a period of 50 years, has been successful in getting two different sets of four stamps released, each featuring a different mineral, gem or fossil. Be sure to support this group in their future efforts.

The Editor Committee brings together bulletin editors from all the federation clubs. They share ideas and talk about ways to improve a club's bulletin, the organ that is so important in keeping club membership informed. Beth Heesacker heads this committee for the Northwest Federation.

At the editors' meeting on this trip, I was reminded of a service that is available to

all clubs that are members of the American Federation of Mineralogical Societies (AFMS): the Federation Lending Library. (If your club belongs to one of the seven regional federations, it is automatically part of the AFMS.)

Sometimes, clubs have trouble getting speakers, and the videos can help fill in the gaps. This library contains between 160 and 170 videotapes and well over 199 discs containing programs like tutorials on faceting, silversmithing, cabochon making, and more, collecting activities, and many, many other topics. Any member club can borrow these at no cost, save postage!

The beauty of this program is that it is updated regularly, and as the older programs become less accessible because of changing technology, Darrell Watkins converts them to newer formats. This is a remarkable effort on Darrell's part and he deserves our thanks and compliments.

Other benefits include income tax help, field trip information, and insurance programs. The work done by various committees of the American Federation helps preserve our collecting localities and keeps an eagle eye on the actions of congressional departments that could negatively impact our hobby. Adding your club's voice to the growing voice of the AFMS helps guarantee the survival of our collecting hobby!

As you can see, it is very important that your club be a part of the federation network. ♦

Bob Jones holds the Carnegie Mineralogical Award, is a member of the Rockhound Hall of Fame, and has been writing for *Rock & Gem* since its inception. He lectures about minerals, and has written several books and video scripts.





PARTING SHOT

MINERALS and JEWELRY



Silver and Gemstone Pendant

This pendant was hand fabricated in sterling silver and has 18k yellow gold accents. The ammonite shapes were cast in sterling silver from a mold made from a pyritized ammonite. The faceted stones are tanzanite (top), amethyst (in the middle of the ammonites), tsavorite garnets (outsides), and a green tourmaline crystal (center).

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